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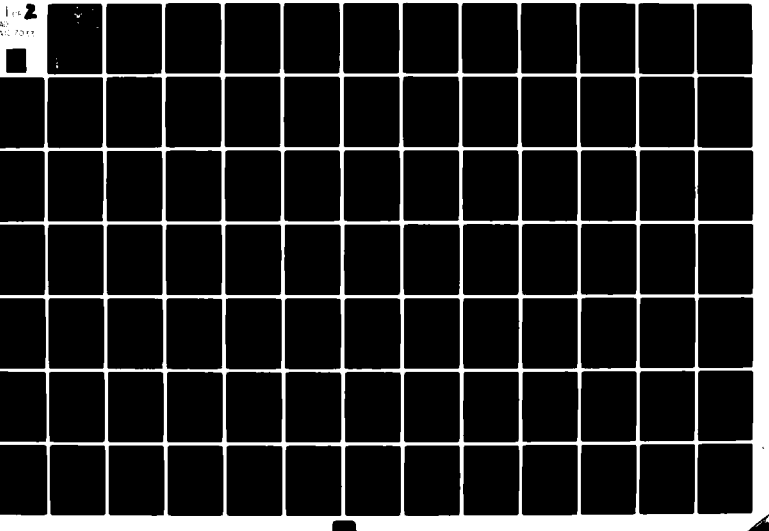

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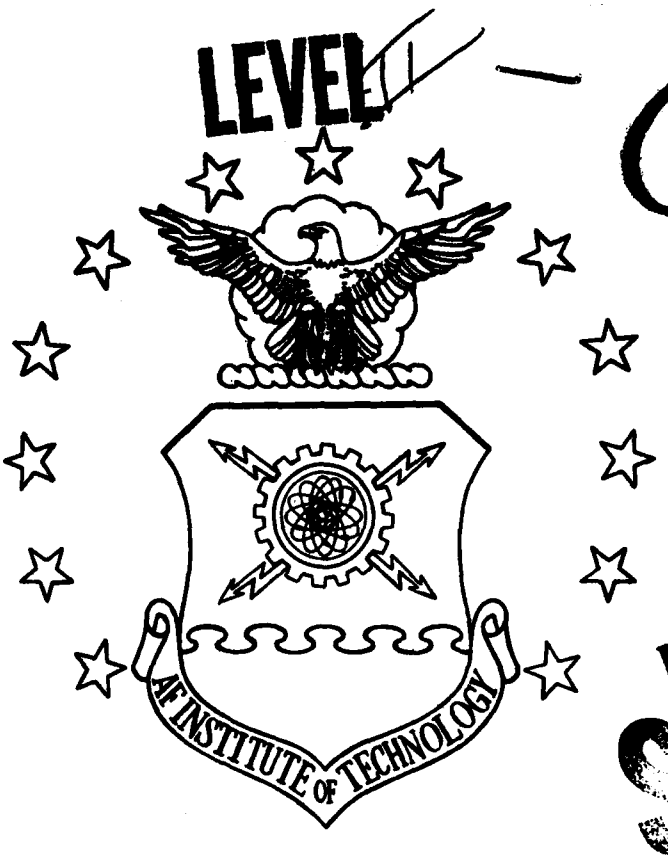

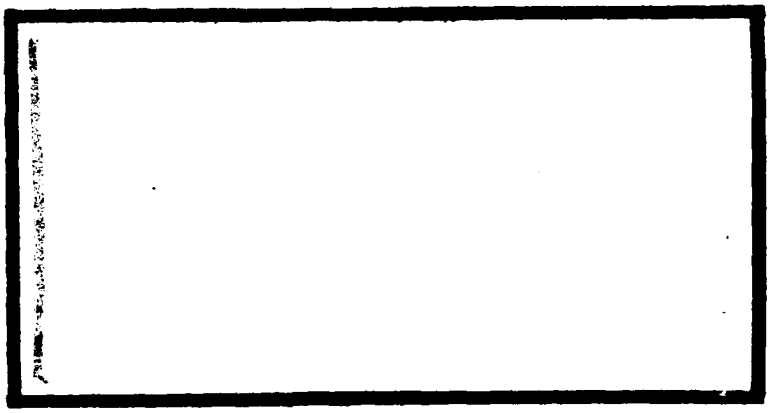

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY (ATC)

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

AN EXAMINATION OF YEAR-END SPENDING WITH REGARD TO DEPARTMENT OF DEFENSE CONTRACT AWARDS

James M. Farrell, Captain, USAF
Paul K. Spendley, Captain, USAF

LSSR 40-81

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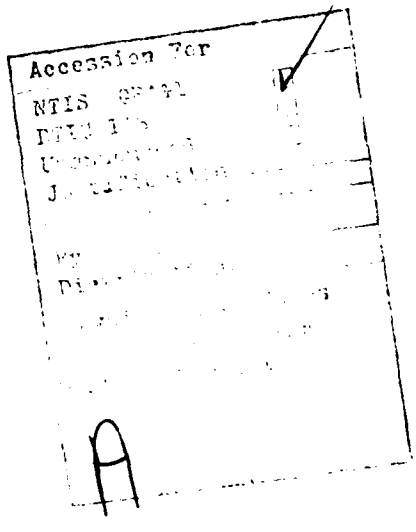

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Investigations conducted by Congress and the General Accounting Office have indicated that a number of Federal agencies, including the Department of Defense (DOD), engage in a year-end spending practice which potentially wastes billions of tax dollars annually. This practice is commonly known as year-end spending surge. The objective of this research was to analyze DOD contract award data to determine the magnitude of any year-end spending surge and to identify the types of procurement activities and the types of commodities involved in the surge. Data pertaining to DOD and Air Force (USAF) contract awards to U.S. business were analyzed for fiscal years 1977 through 1980. The authors concluded that the DOD and the USAF experienced a year-end spending surge. Further, each type of procurement activity examined had a unique award pattern, and not all activities experienced year-end surge. For the USAF, the magnitude of surge of base procurement was the major influence on the magnitude of the USAF surge. The study also includes information concerning the possible influence of appropriations and supplemental appropriations on the DOD year-end surge. Additionally, an examination of DOD award patterns from fiscal years 1952 through 1976 is presented in an appendix.

LSSR 40-81

AN EXAMINATION OF YEAR-END SPENDING WITH REGARD TO DEPARTMENT OF DEFENSE CONTRACT AWARDS

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degrees of Master of Science in International Logistics Management

and Master of Science in Contracting and Acquisition Management

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June 1981

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has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degrees of

MASTER OF SCIENCE IN INTERNATIONAL LOGISTICS MANAGEMENT
(Captain James M. Farrell)

MASTER OF SCIENCE IN CONTRACTING AND ACQUISITION MANAGEMENT
(Captain Paul K. Spendley)

DATE: 17 June 1981

Larry W. Emmelhainz
COMMITTEE CHAIRMAN

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CHAPTER I

OVERVIEW

Introduction

Congressional investigations and General Accounting Office (GAO) reports have determined that a number of Federal agencies, including the Department of Defense (DOD), have engaged in a spending practice which potentially wastes millions of tax dollars annually (6; 7; 42). The spending practice is commonly known as "year-end spending" or year-end spending surge. This descriptive thesis analyzed DOD contract award[1] data in an attempt to provide information which will lead to a better understanding of DOD year-end spending. This first chapter illustrates and defines the concept of year-end spending surge, describes some of the perceived problems associated with this type of spending and reviews the actions which have been taken in an attempt to control year-end spending. The definition and background information are followed by a brief discussion of the research problem, justification, and the statement of the research objective upon which this effort was focused. Finally, the thesis format is presented.

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[1]Contract award is a legally binding instrument executed by a Military Department or Agency of the DOD to obtain supplies, services, or construction [14:100].

Year-end Spending Illustrated

> It happens every August and September. . . all across America federal bureaucrats hurry to spend every last dollar of their budgets. Why the rush? Because when the fiscal year[2] ends on September 30, any unspent funds must be returned to the Treasury. And since Congress allocates money to an agency largely on the basis of how much the agency spent during the previous year, the bureaucrats naturally fear the funds unspent now will be funds unbudgeted next year [32:13].

This exerpt, from an article published in the September 1980 issue of The Readers' Digest, provides a commonly held perception of the Federal government's year-end spending surge. The Digest article, and other media and government reports on the subject, describe specific instances of the practice. For example, in 1979, the Department of Health, Education and Welfare issued $135 million in contracts (approximately one-tenth of the agency's total contract awards for the year) in the last three days of the fiscal year (32:13). Senator Proxmire gave the Golden Fleece Award to the U.S. Air Force for a September 1979 purchase of $715,000 of dormitory furnishings, televisions and air conditioners at Clark Air Force Base in the Philippines (40:1). U.S. News and World Report cited Pentagon purchasers for buying $119,074 of magazine subscriptions on the last day of the fiscal year (39:76). Data published by the National

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[2]The Congressional Budget and Impoundment Control Act of 1974 provided for a shift from a July 1 to June 30 fiscal year to an October 1 to September 30 fiscal year. This shift took place in Fiscal Year 1977 [29:59].

Taxpayers' Union for fiscal year (FY) 1978 indicated that, during each of the first 11 months of FY '78, aggregate government purchases approximated $50 billion or less, but, in September, the figure increased to over $80 billion (40: 17).

Year-end Spending Surge Defined

One U.S. Senator called year-end spending "the process by which Federal agencies obligate[3] huge amounts of money in the last quarter of the fiscal year [40:2]." This is just one of a variety of ways by which the practice has been described. While many of the descriptions convey the essence of the practice, they lack the specificity required for a research approach to the subject. Therefore, the following definition was developed from a review of GAO reports (6; 7) and documents from Congressional hearings on year-end spending (40; 41; 42).

> Year-end spending surge is an observable change in the pattern of a Federal agency's contract awards. A surge occurs when, based on the pattern of award dollars established during the first 11 months, the dollar total of contracts awarded in the last month of the fiscal year is significantly higher than that which would be expected.

This definition was chosen to operationalize year-end spending surge for this research because it is

[3]The U.S. Treasury is responsible to satisfy the financial obligations incurred by the Federal government. Obligations may be incurred to pay employees, contracts, or any other lawful debt of the United States.

indicative of the general focus of other referenced reports and investigations. Previous studies have examined the contract award patterns of Federal agencies relative to the fourth fiscal quarter. However, the cases which appeared to attract the interest of the investigators occurred in the last month of the fiscal year. The Taxpayers' Union data and a study by the GAO both focused on the last fiscal month and used a measure of contract award activity from the preceeding 11 months as a baseline for their analysis (40:17; 7:4).

While the term "spending" is used in this thesis and in other studies on the subject, it is a term without exact meaning within the arena of Federal accounting and procurement. Federal agencies use the term obligation to denote the first legal step in the spending process (6:5). Contract award is one of the primary ways by which legal claims against government funds, or obligations, are created (28:27-30). Contract award, procurements and purchases will be used synonomously throughout this report.

Perceived Problems

Year-end spending surge is an area of concern because of the perception that a sudden increase in contract awards increases the possibility of waste. While investigators have warned against drawing the conclusion that all

year-end awards are wasteful, they have found cases of year-end procurements which, in their opinion, did result in a misuse of government funds.

The GAO and the Senate Subcommittee on Oversight of Government Management found that the surge in awards indicated a corresponding surge in the year-end workload of government procurement offices. These studies concluded that the increased workload combined with the expiration on September 30 of a portion of the funds available for making awards, created adverse pressures on the Federal procurement process. These pressures resulted in increased administrative costs and decreased efficiency in the preparation, negotiation, and administration of contracts. Specifically, the investigators found cases of: increased overtime, purchases without bonafide needs, poorly developed contracts and specifications, violations of procurement regulations, poor analysis of contractor proposals, and decreased administration of existing contracts (42:16-26; 7:21-29).

While the waste associated with year-end spending surge has not been calculated exactly, members of the Senate Subcommittee estimated that the waste associated with year-end spending surge amounted to about two percent of the total Federal contract expenditures. This estimate was based upon government procurement data from 1979. In dollar terms for FY '79, two percent was approximately two billion dollars (42:7). Although all year-end procurements are not inherently

wasteful, the magnitude of the estimated waste and the erro-sion of public trust in government which the perception of such waste engenders makes year-end spending a problem of significant concern for legislators and Executive agency managers. They have responded with various actions to correct this problem.

Control of Year-end Spending

The potential problems of year-end spending surge were first officially recognized by the Director of the Bureau of the Budget, now OMB, in a 1921 memorandum to the heads of Executive agencies. The Director expressed strong concerns about the effects of such a spending practice and urged that it be eliminated. Since that time, Presidents, Budget Directors and Congresses have attempted to control and/or eliminate year-end spending in the Federal government. Memoranda calling for the control of year-end spending surge were issued by President Lyndon Johnson ('65, '66), George P. Schultz, Director of OMB ('71), President Jimmy Carter ('77, '78), and James T. McIntyre, Jr., Director of OMB ('76-'80) (40:18-25).

Congress has attempted to control year-end spending through amendments to appropriation legislation.[4] One such measure, enacted in 1953, restricted or "capped" DOD spending

[4]Appropriations are the legal authority to obligate the Treasury to pay money for goods and services [29:7].

in the last two months of the fiscal year to no more than 20% of the annual appropriation. This restriction was limited to the Operations and Maintenance (O&M) appropriation and was enacted annually since FY '53 (42:13). In addition to appropriation controls, the GAO and Congress both conducted investigations, during 1979 and 1980, of the Federal year-end spending surge (6; 7; 40-42).

Despite the numerous control efforts, Congressionally commissioned audits and the internal audits of Executive agencies confirmed that year-end spending was still present in the Federal government (42:2). While the GAO reported that, on a government-wide basis, year-end surge is declining (6:1), members of Congress have expressed dissatisfaction with the results of previous control legislation and the actions taken by many of the agencies which experience the problem. As a result, general legislation directed at improving the Federal procurement process is now being proposed for FY '82. The proposals include fourth quarter spending caps of all appropriations, increased procurement planning and increased reporting of obligation data to the OMB (42: 40-45).

Some of the proposed controls are acknowledged to be only a temporary solution to year-end spending surge. The congressmen who have proposed appropriation caps intended that the caps be enacted for only a three year period (42:44). The GAO, in giving a qualified approval of "caps", stated

that "such a measure treats the symptom, not the cause, but it appears to be a necessary first step to bring year-end spending under control [7:38]."

Problem Statement

The problem with year-end spending surge is that it has not been understood well enough so that appropriate policy measures can be designed to control it effectively. This lack of understanding is evidenced by a sixty year history of year-end spending surge despite numerous control efforts. The short term nature of proposed controls is tacit acknowledgment of the lack of understanding or confidence that these year-end spending control measures will work.

Justification

The lack of understanding of year-end spending surge not only hampers congressmen attempting to legislate general solutions, but also policy makers of Executive agencies who must insure compliance with the law. Previous studies identified a variety of factors which influence year-end spending. These factors include characteristics of the budget and procurement processes and management philosophies and practices (42:7). Although it is understood that these factors interact in a complex manner, the exact nature of the interactions has not been determined. This situation makes development of effective long term control measures

extremely difficult. Ms. Susan Collins, a Senate staff member, states that the Oversight Subcommittee remains open to and encourages further research efforts on the subject of year-end spending (5). The GAO indicated that more detailed studies of individual agencies are still required (7:14).

Research Objective

The objective of this research was to analyze DOD award data to determine the magnitude of any year-end surge, and to identify types of procurement activities, and the types of goods or services involved in the surge.

To achieve the purpose of this study, an empirical analysis of DOD contract award data was conducted. As this research was intended to be descriptive in nature, the focus of the analysis was the "what" and "where" of year-end spending surge relative to DOD procurements. The "why" of year-end spending and the interaction of influencing factors were not specifically addressed in this analysis.

Format of Research Report

This research effort is presented in five chapters accompanied by four appendices. Chapter I was designed to familiarize the reader with the concept of year-end spending surge, the general scope of the study, and the specific research objective. Chapter II is a detailed review of the year-end spending literature, and presents the research

questions which evolved from the literature review. The analysis methodology is developed in Chapter III, with the actual findings of that analysis presented in Chapter IV. The fifth and final chapter draws conclusions from the findings concerning year-end spending for DOD procurements, discusses the impact of the conclusions on future policy actions, and makes recommendations for further research.

Appendix A describes a pilot study of 25 years of DOD award data (1951-1976). Pertinent information concerning the DOD budget execution process and the organization of the DOD procurement system is contained in Appendices B and C, respectively. The computer programs used in the primary analysis for this research effort are included in Appendix D. Readers who are not familiar with the DOD budget execution process or DOD procurement organization are encouraged to read Appendices B and C before proceeding to Chapter II.

CHAPTER II

BACKGROUND

Introduction

This chapter presents information which influenced the direction of this research. The chapter is divided into four parts: a literature review, a justification for the effort, a restatement of the objective, and the research questions to be addressed. The literature review describes written materials and interviews related to year-end spending in the broad scope of the Federal government and in the narrower scope of the DOD. It also includes possible causes which have been identified and control measures which have been proposed.

Literature Review

Government-wide Studies

While numerous studies have been published concerning year-end spending surge, most of the studies focused on the practice as it occurred in a specific Federal agency. The studies presented in this section are those which investigated the practice on a government-wide basis. Although each study had certain unique objectives, they all shared the common objectives of: identification of agencies

exhibiting year-end surge, determination of possible causes, and recommendation of measures to control or eliminate the surge. The reviews of individual studies are followed by a summary of the causes of year-end spending surge, the proposed control measures, and a synthesis of the studies.

The first comprehensive study of year-end spending surge in the Federal government was undertaken by the Senate Committee on Governmental Affairs, Subcommittee on Oversight of Government Management, in November of 1979 (42:III). The study examined the year-end spending practices of ten agencies including the Departments of Commerce, Defense, Interior, and Health, Education and Welfare. The Subcommittee focused on the obligations made by the procurement offices of these agencies. This focus was based on the assumption:

> . . . that if government officials were abusing the Federal procurement process - governed by thousands of pages of law and regulations - in order to award funds by year-end, abuses would be highly likely to occur with other obligational instruments [42:3].

The Subcommittee examined data extracted from Treasury Department records and the files of the agencies being investigated. These data were supplied at the written request of the Subcommittee, or were presented as exhibits to accompany the testimony of agency officials at the public hearings conducted as part of the investigation. During the hearings, instances were cited for each agency which were interpreted by the committee to be examples of purchases of

goods and services without bona fide need, or inefficiencies in procurement practices which were attributable to year-end spending surge (42:7).

After reviewing the data and the testimony of expert witnesses, the Subcommittee concluded that each of the investigated agencies experienced a year-end spending surge. It was further concluded that a sufficient number of examples of questionable year-end procurements had been presented to allow the committee to establish that an annual waste of two billion dollars could be attributed to year-end spending surge (42:III).

A GAO study dated July 28, 1980, summarized the conditions found during a review of year-end spending in 16 Federal agencies. The DOD was not included in this study. Procurement award data for fiscal years 1978 and 1979 were extracted for each agency from the Treasury Bulletin, a monthly publication, which is "the only source for Government-wide obligation totals by agency by object class [7:3]." The data were analyzed based on the following definition of year-end surge: "September surge is defined as the amount of funds obligated during September which are in excess of the average amount of funds obligated during the prior 11 months [7:4]."

To test for surge based on this definition, the GAO analyst first calculated the average amount of dollars obligated during the first 11 months of each fiscal year.

This average amount was subtracted from the dollar amount of September obligations. This difference was then divided by the average to determine a "surge percentage" (7:4). The GAO found that 12 of the 16 agencies had positive surge percentages in FY '78, and 10 of the 16 had positive surge percentages in FY '79 (7:83-84).

This test for surge was also applied to the aggregate of obligations of the 16 agencies for five selected classes of goods and services. Positive surge percentages were recorded for all object classes for FY '78, and four of the five object classes for FY '79 (7:84-85). Statistics and cases were also presented which, in the opinion of the GAO, showed year-end related violations of procurement law and agency policy, increases in use of overtime to handle the year-end workload, purchases of goods and services without bona fide need, and inefficiencies in year-end procurement practices (7:20-29).

The study concluded that, while year-end spending surge declined from FY '78 to FY '79, evidence of uncontrolled year-end surge still existed government-wide. The resulting inefficiencies attributed to year-end surge were found to cause the procurement process to be less effective and some purchases to be less economical (7:30).

A second GAO study of year-end spending surge was published on October 3, 1980 (6). In this study, the obligation patterns of 21 Federal agencies, including DOD agencies,

were analyzed. Obligation data for each agency for fiscal years '77, '78, and '79 were drawn from the Treasury Bulletin. The methodology for this study involved the conversion of the dollar value of obligations for the fiscal quarters into percentages of the total dollar value of obligations for the fiscal year. Additionally, the dollar value of monthly obligations in the fourth quarter were converted to percentages of the total obligations for the quarter. In this manner, the annual and fourth quarter obligation patterns were developed for the combined total of obligations of the 21 agencies, the obligations of each agency, and obligations for 10 selected object classes for each agency.

The GAO found that the fourth quarter percentages of the combined total of obligations declined from 33 percent in FY '77 to 29 percent in FY '79. As a percentage of the combined obligations for the fourth quarter, the September percentage declined from 73 percent in FY '77 to 37 percent in FY '79 (6:15-16). The analysis of obligation patterns of individual agencies found five agencies which consistently obligated more than 33 percent in the fourth quarter and 15 percent in the month of September. These five agencies were: the Departments of Commerce, Health, Education and Welfare (HEW), Housing and Urban Development (HUD), Interior, Judiciary, and the Environmental Protection Agency (EPA)(6:18). As a result of the object class analysis, a majority of the agencies examined, including DOD agencies, were cited for

obligating 30 percent of total annual Lands and Structures[1] obligations in the fourth quarter. In a number of cases, the agencies were additionally cited for obligating over 67 percent of the fourth quarter Land and Structures funds in the month of September (6:28-31). A scan of the tabulated object class data for DOD agencies indicated that some agencies experienced September surges in obligations for particular object classes.

The study concluded that while government-wide year-end spending surges are decreasing, some agencies still had significant surges in year-end obligations. A number of agencies experienced surges in obligations for certain classes of goods and services. The interviews of personnel in the investigated agencies led the GAO to further conclude that "year-end spending surges can also contribute to increased overtime costs, reduced staff morale, and poorer quality contracts and grants [6:8]."

Possible Causes of Year-end Spending Surge

The Subcommittee and GAO reports included discussions of factors that were deemed to be probable causes of year-end spending surge. Causes appeared to be related to

[1]Lands and structures obligations are made for such purposes as the construction of new facilities, additions to existing facilities, landscaping, and the purchase of heating, lighting and air conditioning systems (6:101).

characteristics of the budget process, the procurement process and past management of these processes by Congress, OMB and individual Federal agencies.

Budget Process Characteristics

The budget review process has created the perception that agencies which do not obligate all available funds will have future budgets reduced by an amount which is approximately equal to the amount of unobligated funds. Senator Cohen, a member of the Oversight Subcommittee, criticized the Congressional practice of determining the validity of an agency's budget request on the basis of the amount of unobligated balances, rather than on the objective analysis of the agency's needs or efficiency with which the agency accomplishes its function (42:10). The GAO made the following assessment of budget review practices: "Under the current practices, agencies run the risk of having future appropriation requests reduced if large fund balances remain unobligated at the end of a prior fiscal year [7:5]."

Late approval of appropriations by Congress was also cited as a cause for year-end surge (42:8; 7:11). Most agency managers acknowledged that it was possible to work around late approval of regular appropriations. However, late approval of large supplemental appropriations was felt to be a significant problem for government managers. A supplement to the Operations and Maintenance appropriation

(O&M) is normally required to meet the increases in personnel and energy expenses which are incurred throughout the year. The uncertainty as to the amount of the supplement which will be approved, and the possibility of late approval causes managers to defer other O&M obligations for lower priority needs until they are assured that sufficient obligation authority will be available to meet the already incurred personnel and energy obligations. A late approval of supplements to Operations and Maintenance appropriations, which expire on September 30, creates a surge in obligations when managers attempt to fulfill deferred needs prior to the expiration of the appropriation (42:9).

Procurement Process Characteristics

Characteristics of the procurement process also affect the year-end spending surge. For example, lengthy procurement negotiations can result in contract awards at year-end. For some contracts, the process of negotiating contract terms and prices may take up to six months or longer. If, for any reason, negotiations for such contracts are delayed or interrupted, final agreement on the contract may occur at the end of the fiscal year (7:8). Or, some agencies may have seasonal requirements for which contracts may be awarded at year-end (7:8; 6:3). Occasionally, unexpected procurement opportunities arise at year-end which may enable the government to realize a savings on the purchase of particular goods or services (7:8).

Management Practices

Office of Management and Budget. The OMB was criticized by the Subcommittee for not being aggressive in its leadership role as overseer of Federal management practices. While OMB has issued annual memoranda directed at controlling year-end spending, testimony before the Subcommittee indicated that the memoranda were ineffective for two reasons. First, the memoranda were not clear statements of policy. Second, the OMB had not followed-up on the memoranda by reviewing the agencies' policies to insure compliance with the directives contained in the memoranda. Additionally, the Subcommittee found that the OMB had not developed its own plan to control and oversee year-end spending practices of Federal agencies (42:36-39). GAO investigators concluded that OMB had not been adequately monitoring and controlling the budget execution process (6:2).

Federal Agency Management. Among the Federal agencies examined by these studies, management practices at all levels were found to contribute to the year-end spending surge. Managers were found to be delaying procurement decisions either to allow more competition between proposed alternatives or to maintain a reserve of funds to meet possible emergency situations. Also, as was mentioned earlier, procurements were being deferred because of the uncertainties which surrounded the supplemental appropriations process. In most cases these delays were considered to be prudent

managerial decisions (42:26; 6:4). However, in some instances, managers were not aware of the impact of such actions on the procurement process (42:27). The GAO stated that such a deferring of procurements increased the year-end work-load in procurement offices to the point where procurement procedures became rushed and less efficient (7:12; 6:4). Inadequate procurement planning by managers was also cited as a cause of year-end spending. In some cases, plans were not being developed which insured the accurate determination of needs, and the initiation of procurement actions which would time purchases with the most favorable market conditions while evenly distributing the procurement workload throughout the fiscal year (42:27; 7:9). Finally, some managers were not adequately monitoring budget execution and procurement activity and were consequently unaware that year-end surge was occurring in their organizations (7:9; 6:7).

Proposed Control Measures

Based on the identified causes of year-end spending, a variety of measures have been proposed to attempt to bring year-end spending surge under control. The proposals include increasing the planning and the monitoring of the budget execution and procurement processes. Also proposed was the enactment of spending caps through appropriation legislation.

Planning

It was recommended by the Subcommittee and the GAO that the OMB develop policy directives mandating advanced procurement planning by all Federal agencies. Such directives would indicate how annual procurement agendas or schedules are to be developed and implemented. The OMB would be required to approve these agendas and any subsequent deviations (42:40; 7:31). It was also recommended that the OMB direct the Office of Federal Procurement Policy (OFPP) to record and monitor procurement data on all contracts in excess of $10,000. Such records would include data of specific procurement milestones from the receipt of the request for procurement action through the date of contract award (42:40). Mr. Jack Nadol, the OFPP Project Officer for Year-end Acquisition Matters, indicated in a telephone interview, on April 9, 1981, that OFPP directives regarding these recommendations were in the final stages of review, and would soon be released to all Federal agencies (33).

Appropriations Spending Caps

In 1980, legislation was proposed in both the Houses of Congress to impose limitations on the amount of an appropriation which could be obligated in the last two months of the fiscal year (42:44). The proposed limit of 20 percent was similar to that which has been imposed on the DOD's Operations and Maintenance appropriations since 1953. The

difference between the proposed legislation and the DOD cap was that the new cap would be applied to all of an agency's appropriations rather than selected appropriations, as is presently the case with the DOD cap. This action was taken despite the Subcommittee's recommendation that appropriations not be capped (42:42). The Subcommittee and the GAO pointed out in their reports that a spending cap does not address the causes of year-end spending, and that caps are extremely difficult to administer (42:42; 6:8). However, the GAO did give a qualified endorsement of a temporary cap on the basis that such an action was necessary to emphasize the seriousness of the year-end spending surge and to initiate a change in Federal government obligation patterns (6:8).

Other Recommendations

The Subcommittee and the GAO proposed a number of additional actions to control year-end spending. These recommendations include increased audits of year-end procurements by an agency's internal inspectors, revisions of procurement regulations, and adoption of performance appraisal procedures which would recognize government personnel for prudent and efficient management of government funds. Finally, the President was required to direct the preparation of more accurate budget proposals by Executive agencies. This action was recommended in order to reduce the size of the supplemental appropriations, and their corresponding impact on the year-end surge (42:40-43).

Summary of Government Studies

Each of these major studies analyzed obligation data from no less than ten government agencies for the common purpose of identifying the existence of a year-end spending surge and its causes, and recommending appropriate controls. It should be noted that the GAO examined contracts and other obligations in their investigations, while the Subcommittee focused on obligations made by contract awards. All three studies concluded that a number of the agencies investigated, including the DOD, experienced year-end surge during the periods of investigation. Each study also suggested that certain goods and services could be identified with year-end surge in a given agency. While each study made a judgment as to the waste involved with year-end spending, the point was emphasized in each study that all obligations at year-end cannot be considered wasteful (6:5; 7:i; 42:5).

Year-end Spending in the DOD

A review of DOD literature indicated that the prime source of current information concerning year-end spending was the DOD testimony before the Senate Subcommittee on Oversight of Government Management, and the documents which accompanied that testimony (41:267-288). Mr. Dale W. Church, Deputy Under Secretary of Defense for Research and Engineering (Acquisition Policy), was the DOD spokesman at the

Subcommittee hearings. Procurement statistics for FY '79, cited in the testimony, indicated that the DOD experienced a September increase in the number of contract actions for purchases over $10,000. According to those statistics, the number of recorded actions averaged 25,000 per month. In September, 36,000 contract actions were recorded (41:270).

Mr. Church explained that this increase in September actions was largely the result of prudent management actions. DOD managers deliberately defer the purchase of lower priority goods or services until the end of the year in order to maintain a reserve of funds for emergency situations and high priority programs (41:270). According to Mr. Church, the characteristics of the supplemental appropriation process also necessitated the deferment of certain contract awards until year-end. Construction contracts for the maintenance and repair of DOD facilities were cited as the type of contracts often deferred until year-end (41:287). The DOD testimony specifically stated that the increase in year-end procurement actions was not the result of seasonal conditions (41:280).

When questioned about the possibility that the DOD year-end spending practices can cause undesirable purchases at year-end, the Secretary acknowledged that in the DOD procurement system, with over 800 procurement offices placing approximately 11.4 million actions annually, examples of undesirable purchases could be found. The testimony

indicated that, in the opinion of the DOD, incidences of poor purchases were not related to the time of year of the purchase (41:278, 282), and that such procurements can be minimized through effective procurement planning (41:282). Mr. Church noted a number of techniques used by the DOD to prevent rushed year-end buying. Included among these practices were: the use of advance procurement plans for major acquisitions, the quarterly allocation of O&M funds, the establishment of cut-off dates for the acceptance of purchase requests, and the award of annual, repetitive contracts at the beginning of the fiscal year (41:283).

The authors were able to obtain copies of the Air Force input to the DOD testimony and the computer summary of DOD FY '79 procurement data which provided the statistics for that testimony. The Air Force discussion of year-end spending identified procurement as two general types of activities: base procurement and central procurement. It was noted that in FY '79, base procurement, which supports the operations and maintenance of USAF installations, experienced an increase in contract awards at year-end. Central procurement, which is responsible for the consolidated purchases of USAF weapons systems, supplies, and services, did not experience a significant increase in year-end contract awards (15). The computer summary included the monthly number of awards and the corresponding dollar totals for purchases for research and development and a number of selected equipment

items and services. September purchases for research and development and some of the other selected items indicated an increase in both numbers of actions and dollar totals (15).

A series of interviews with procurement personnel at Air Force Headquarters, Air Force Systems Command Headquarters, and Air Force Logistics Command Headquarters yielded the following information:

1. Base procurement does experience an increase in contract awards at year-end, especially in construction contracts. However, it is believed that the magnitude of such an increase is not significant relative to total DOD awards at year-end (33).

2. Air Force Systems Command experiences a slight increase in procurement activity at year-end due to modifications of existing contracts rather than new contract awards. However, Research and Development procurement activities within the command may be an exception, and may experience an increase in new awards at year-end (45).

3. Data compiled by the Procurement Analysis Division, Air Force Logistics Command, indicated that the command's central procurement activities experience a decrease in awards, while base procurement activities experience an increase in awards at year-end (44).

When the interviews and a publications search conducted by the Defense Logistics Studies Information Exchange (DLSIE), failed to produce evidence of previously

published reports which analyzed DOD year-end spending, the authors conducted an exploratory study using DOD procurement data published by the Washington Headquarters Service for fiscal years 1951 through 1976 (13:83-85). The findings of this study (See Appendix A) led the authors to conclude that DOD contract awards consistently increased in the last month of the fiscal year for the 25 year period.

Synthesis of DOD Information

The DOD testimony before the Senate Subcommittee and the background papers prepared for that testimony are the prime sources of information concerning year-end spending in the DOD. This information indicated that the DOD is possibly experiencing a year-end surge in contract awards. Further, the background information and the interviews of USAF personnel indicated that increases in contract awards may be traced to particular procurement activities and to particular goods and services purchased by these activities.

Justification for Research

After reviewing the available literature concerning year-end spending in the Federal government and the DOD, the authors concluded that further research was warranted for two reasons. First, previous investigations have indicated the need for further study. Ms. Susan Collins, a staff director of the Oversight Subcommittee investigation,

has confirmed that members of Congress continue to be interested in further research in this area (5). The GAO study of October '80 specifically stated that an in-depth analysis of individual government agencies is still required (6:14). The temporary nature of some of the proposed control measures is also testimony to the fact that year-end spending surge is still not understood well enough to enact long-term controls.

Second, the DOD has been cited by Congress as a Federal department with an identifiable year-end surge. This perception will predictably cause the DOD to be subjected to repeated examination until the character of DOD purchasing practices are known. In fact, in February 1981, the House of Representatives' Committee on Appropriations commissioned a major 26 point study of DOD procurement practices (1). Within the DOD there are no reference documents to which the DOD executives or staff may turn in response to such inquiries. The lack of such reference material also leaves the DOD less prepared to develop appropriate policies relative to the procurement process. Because of the stated need for further analysis, and the specific requirement to examine DOD procurement practices, and because of the apparent lack of such studies in the DOD, this effort pursued the following objective.

Research Objective

The objective of this research was to analyze DOD contract awards to determine the magnitude of any year-end

surge in awards, and to identify the types of purchasing activities and the types of goods or services involved in the surge.

Rationale

As was stated in Chapter I, this objective was selected to provide information which could be used by the DOD to establish effective policies and procedures in regard to year-end procurement practices. While two major studies have identified year-end spending surge as a problem in the DOD (6; 42), the magnitude and specific characteristics of the DOD surge have not been addressed.

The government-wide studies of year-end spending treated procurement in the very broadest terms, apparently assuming all procurement activity was the same. Information supplied by the DOD indicated that there were distinctly different procurement activities, some of which appear to be more susceptible to year-end surge than others. The DOD has identified eight classes of procurement activity: base support, area support, industrial support, supply systems support, weapons acquisition, research and development, transportation services and construction (See Appendix C). Each activity is designed to satisfy specific requirements and involves specific procurement skills (3:3-7). While each service component uses a unique organizational structure for procurement, all eight activities are accounted for in each service system (3:45-64). Failure to recognize these

activities within an analysis of contract awards could result in misinformation and the proposal of general solutions to the year-end spending surge which may control the surge effectively in one activity only to cause new problems for another activity.

Finally, when developing control measures it may be helpful to know which goods or services are purchased during the year-end. If particular items are procured consistently and in substantial quantities at year-end, it may be possible to institute a policy which will more evenly distribute such purchases throughout the year, if such a policy would be advantageous to the government.

Research Questions

To satisfy the objective of this study, the research attempted to answer the following questions:

1. What is the approximate magnitude of the year-end surge experienced by DOD?

2. Does an identifiable type of DOD procurement activity exhibit a year-end spending surge?

3. Are particular goods or services purchased in higher proportions at year-end?

CHAPTER III

RESEARCH METHODOLOGY

Introduction

This chapter presents the methodology used to answer the research questions posed in Chapter II. This chapter has been divided into the following sub-sections: operational definition of year-end spending surge, research population, data sources, data collection methods, and research design and tests. The discussion within each sub-section includes the rationale, assumptions, limitations, and strengths and weaknesses associated with that element of the methodology. The chapter concludes with a summary of the major assumptions used in developing this methodology.

Operational Definition of Year-end Spending Surge

Year-end spending surge is an observable change in the pattern of Department of Defense contract awards. A surge occurs when, based on the pattern of award dollars established during the first 11 months, the dollar total of contracts awarded in the last month of the fiscal year is significantly higher than that which would be expected.

Rationale

This definition remains basically unchanged from the definition in Chapter I, as does the rationale for the development of the definition. Details of the rationale can be found in Chapter I.

Research Population

Description

The research population selected for this study was dollars awarded to U.S. business by the DOD during the period FY '77-'80. Awards to U.S. business are defined as legally binding instruments executed by the DOD to obtain supplies, services or construction from companies, individuals or partnerships organized for profit which are located within areas subject to the complete sovereignty of the U.S. (trust territories not included) (14:90-101). This population was used for research question one. A sub-population, Air Force (USAF) dollars awarded to U.S. business was used for questions two and three.

Rationale

The DOD procurement reporting systems produce two standard report formats: world-wide total and awards to U.S. business firms. The world-wide reports contain data on awards made to four broad categories of contractors: Intra-governmental, Foreign (for work outside the U.S.), Educational and Non-profit Institutions, and U.S. Business Firms

(14:9). The population of awards to U.S. business firms was selected for the following reasons:

1. Of these four categories of contractors, U.S. business received approximately 80 percent of the dollar value of DOD awards in any given year (14:8-12).

2. The exclusion of the Intergovernmental category removes the effect of Foreign Military Sales (FMS) procurements which are exogenous to the DOD budget execution and procurement processes. In FY '80, FMS procurements represented over 9 percent of total DOD awards (14:2-3).

3. Awards to firms for work outside the U.S. were excluded to minimize the vagaries of award data attributable to non-recurring military responses to international incidents.

4. Educational and non-profit institutions account for a minor portion of DOD award dollars, for example, 1.69 percent in FY '79 (14:12).

Sub-population. The original intention of the authors was to use DOD-wide data for the study of all three research questions. However, an investigation of possible data sources revealed that the USAF was the only DOD component which records dollars awarded to U.S. business by type of procurement activity making the award, e.g., Base, and Research and Development (4; 46). Further, the same report which identified awards by types of activities also identified awards by type of commodity for each activity. Because the

USAF data were structured to potentially answer research questions two and three, the authors decided to use the USAF data and accept the resulting limitation on the research conclusions. Awards to U.S. business account for approximately 76 percent of total awards (14:9-12).

Time period - FY '77-'80. The time period for the study, FY '77-'80, was selected to provide the most current information concerning the DOD award pattern. The pilot study indicated that the award patterns have experienced noticeable changes since FY '51 (See Appendix A). Also, since the award pattern of any single year could be affected by a non-recurring anomaly, the analysis of four years of data provided more conclusive answers to the research questions. FY '77 was also the first year following a change in the fiscal year starting point. All fiscal years studied started on October 1st and ended on September 30th.

Limitations

The use of the selected research populations imposed the following limitations on the study:

1. Exclusion of award categories did not allow exact determinations of magnitude of identified year-end surges for DOD or USAF.

2. Use of Air Force data for questions two and three did not allow conclusions from the findings for these two questions to be made for the DOD as a whole. However, specific conclusions were made which should be informative

to USAF procurement managers, and which may help DOD managers to better understand some year-end spending patterns.

Assumptions

The following assumptions were made in the selection of the research population:

1. The patterns of award dollars are adequate indicators of the pattern of activity in the procurement process.

2. The pattern of dollars awarded to U.S. business by the DOD is representative of the total DOD pattern of awarding contract dollars.

3. The pattern of dollars awarded to U.S. business by the USAF is representative of the total USAF pattern of awarding contract dollars.

Data Sources

Description

Question One. The data source used to answer the first research question was the report Military Prime Contract Awards which is published semi-annually by the DOD, Washington Headquarters Service (WHS), Directorate for Information Operations and Reports. Among the statistics tabulated in this document are the total dollar values of awards for each month for FY '51 thru the current year of the report.

Questions Two and Three. The data source used for the second and third research questions was the USAF report

7102, Part II, Contract Awards to Large and Small U.S. Business Firms. This report is produced by the USAF Procurement Management Reporting System (PMRS), designated as the J-001 System (20). This report provides the monthly total dollar value of USAF awards to U.S. business, and presents monthly total award dollars by four general types of procurement activity:

1. Base Procurement, which includes base, area support, and construction activities;

2. Central, which includes the weapons acquisition procurements of Air Force Systems Command (AFSC), and the supply systems and industrial support activity of Air Force Logistics Command (AFLC);

3. Central (other), which includes supplies system support and transportation services and construction activities performed by all other major USAF Commands;

4. Research and Development, which performs R&D activity (17:8).

Subtotals of awards by type of commodities are also provided. The DOD Procurement Coding Manual lists 26 general commodity codes[1] (16). The 7102 report lists an additional two codes, UTL, for Utilities and 057, to indicate awards for all commodities under $10,000.

[1]The DOD coding manual uses the term "claimant code", however the authors have used the term "commodity class" or "type of commodity" as a more easily interpreted substitute.

Rationale

Applicability. The data sources were selected because they provided data which were applicable to the study. Both data sources were reports produced by the DOD and USAF Procurement Management Reporting Systems. These systems maintain master files of all DOD/USAF contract awards. It should be noted that the reports produced by this system provide census data rather than sample data of DOD/USAF awards.

Accuracy. The PMRS data is used to produce reports for the President, OMB, the Congress and high level DOD and USAF procurement managers. Consequently, the accuracy of the input data receives considerable management attention (22: 14). Since these reports are closely monitored by the reporting organizations and the management staffs of the DOD, the reports were assumed to be accurate.

Data Collection

Description

Since the data sources provided census data, no sampling plan was required and a simple extraction process was employed.

Question One. Data required for the first research question were collected from the WHS report Military Prime Contract Awards for Fiscal Year 1979, Appendix, Table B, Awards to U.S. Business firms by Month. Total dollars

awarded per month were extracted for each month for FY '77-'79. Because Table B was not included in the FY '80 report, the required data for that year were supplied by Mr. Ray Goodman of the WHS (30).

Question Two. The data for question two were extracted from copies of the 7102, Part II. The copies of these reports were obtained through written request to Mr. Robert F. Brown, Plans and Programs Division, Directorate of Contracting and Acquisition Policy, Headquarters, USAF. Total USAF award dollars per month and total award dollars per month by type of procurement activity were extracted for each month for FY '77-'80.

Question Three. The 7102 report was also used to answer question three. Total USAF dollars awarded per month for each type of commodity were extracted for each month for FY '77-'80.

Data Transformations

Current Dollars

Prior to applying selected quantitative techniques, the current dollar values of monthly awards were converted to 1972 constant dollars. This conversion was made using price deflator indexes published by the U.S. Department of Commerce for Federal government purchases of goods and services (43). The third quarter indexes for calendar years 1976-1980 were used to calculate approximate monthly

deflators for fiscal years 1977-1980. Third quarter indexes for calendar years correspond to fourth quarter indexes for fiscal years. Monthly deflators were calculated in the following manner:

1. The annual change in the index during a given fiscal year was determined by calculating the differences in calendar year third quarter (fourth quarter year fiscal year) indexes between the subject year and the preceeding year.

2. That difference was divided by twelve to obtain the average monthly change in the index.

3. The deflator for the first month of the subject year was calculated by adding the average monthly index change to the fourth quarter index of the preceeding year. Successive additions of the average index change produced approximate deflators for each fiscal month.

4. The transformation of current award dollars to constant dollars was then made using the following equation:

$$\text{Constant dollars} = \frac{\text{Current dollars x 100}}{\text{Deflator}}$$

(26:500)

Rationale

The authors used constant dollars in their analysis to minimize the monthly effect of inflation on award dollar totals. The use of constant dollars also allowed the aggregation of data when necessary for analysis.

Percentages

After the quantitative procedures were accomplished using constant dollars, the results were converted to percentages. The use of percentages facilitated data analysis and presentation. This approach followed the methods used in the pilot study, as well as that of other studies previously identified in the literature review.

Research Design and Test-Questions One and Two

Objective

The objective of research questions one and two was to determine whether the DOD, USAF or particular types of USAF procurement activities experienced year-end surge. According to the operational definition of year-end surge used for this research, that determination required:

1. A mathematical description of the pattern of award dollars for the first 11 months.

2. A maximum expected value for the twelfth month derived from the mathematical description of the award pattern of the first eleven months.

3. A comparison of the maximum expected twelfth month award dollar amount with the actual amount of the contract dollars awarded in the twelfth month.

Model for the Award Pattern

A linear trend model of the form:

$$Y = (A + BX) + I ,$$

was used to describe the pattern of award dollars of each population for the first 11 months of fiscal years '77-'80. The model expresses the pattern of award dollars (Y) as a function of a linear trend (A + BX) and the irregular fluctuations (I) of award dollars from the trend line (34:644). A least squares trend line (Y = A + BX) was used to describe the tendency of award dollars to increase or decrease over time. The standard deviation of the trend function was used to describe the irregular fluctuations (I) in the model.

Least squares method. The least squares method is a mathematical fitting of a straight line to a set of data using the following equations:

$$A = \frac{1}{n}\left(\Sigma Y_i - B\,\Sigma X_i\right)$$

$$B = \frac{\Sigma X_i Y_i - \dfrac{(\Sigma X)(\Sigma Y_i)}{n}}{\Sigma X_i^2 - \dfrac{(\Sigma X_i)^2}{n}}$$

where n = 11, i = i - 11, and x = a numeric code for time, in this case, October = 1, November 2, etc. [34:615]. The result of this method is a straight line which is the "best", unbiased descriptor of the linear relationship between two variables, in this case, award dollars and months (11:266). The least squares trend line of the monthly award dollars is analogous to the mean of award dollars adjusted for the persistent increases or decreases which are

a function of time (11:266). The reader should note that the least squares method can be influenced by extreme values in the data set. Such extremes are more often found in data which is related to time, such as monthly award dollars. The influence of extreme award dollar values reduces the ability of the least squares line to most completely or effeciently describe the trend in the award pattern (11:266; 34:649).

Standard deviation. The standard deviation of the trend function was used to account for the irregular fluctuation in the model. Once the A and B values of the trend function were determined by the method of least squares, it was possible to compute the amount of deviation from the trend for each value of the data set (Y_i). The trend value ($\hat{Y}_i$) for each month was calculated and subtracted from the actual value award dollars for each month to obtain the deviation due to irregular fluctuation for a given month ($Y_i - \hat{Y}_i$). To calculate the typical or standard deviation for the trend function, the following formula was used:

$$s = \sqrt{\frac{\Sigma(Y_i - \hat{Y}_i)^2}{n-2}}, \quad \text{where } i = 1\text{-}11, \text{ and } n = 11.$$

The standard deviation provides an unbiased estimator of the irregular fluctuation of award pattern (34:451-456).

Test for Surge

The trend function and standard deviation were used to calculate the maximum month 12 award value that would be

expected based on the award pattern of the first 11 months. The following formula was used in that calculation:

Maximum Expected Award Dollars$_{12}$ = Trend value$_{12}$ + 2s, where s = standard deviation. This calculation was performed for the annual patterns for each population. The test for surge compared the actual month 12 award dollar value with the model-generated maximum expected award dollar value for month 12. If the actual award dollar value exceeded the model value, a surge was concluded to have occurred. If a surge occurred in more than two years for given population, it was concluded that year-end surge was a persistent characteristic of the award pattern for that population.

Rationale for the Model

A trend model was selected because the composite graphs analyzed in the pilot study indicated that the model would adequately describe the trend and irregular fluctuations of the most current DOD award patterns. While the composite graphs of award patterns in the 1950's and early 1960's indicated marked seasonal fluctuations, the graphs of the late '60's and early '70's indicated that the seasonal influence was no longer a significant feature of the award pattern of the first 11 months. Observations of the graphs of the early '70's indicate that the trend in the award pattern could be approximated by a straight line. The authors decided that any mathematical description of the award

pattern, for the purpose of conducting a test for year-end surge, must account for the observable trend and irregular fluctuation in the award pattern.

Rationale for the Test

The calculation of a maximum month 12 award dollar value using the trend value plus two standard deviations was based on a test of the pilot study data. A maximum award dollar value for the first 11 months of FY '52-'76 was calculated based on the mean award value of that period plus two standard deviations. Of the 275 data points tested, less than 10 percent exceeded this maximum value. The results of this test led the authors to conclude that two standard deviations would provide a measure which distinguished month 12 award dollar totals which are the direct result of year-end spending influences from those which are within the expected limits of the 11 month award pattern, i.e., normal activity.

Assumptions

The following assumptions were made in designing the test methods for questions one and two:

1. DOD and USAF awards for the first 11 months of the year are not influenced by the factors which cause year-end spending surge.

2. The DOD and USAF award patterns for the period studied are the same or similar to the DOD award pattern observed in the pilot study for the period FY '71-'76.

3. A linear function ($Y = A + BX$) is a good descriptor of the trend in the award patterns for the research populations.

4. The deviations from the trend line are time-independent.

Strengths of Design and Test

The major strengths of the methodology for questions one and two include:

1. The model accounted for the influences of trend and irregular fluctuation in the award patterns it described.

2. The model allowed for a more powerful test for year-end surge than the models used in previous studies (6; 7).

3. The least squares line is an unbiased estimate of the trend (34:649).

4. The standard deviation of the model is an unbiased estimator of the irregular fluctuation about the trend line (34:456).

Weaknesses of Design and Test

The following weaknesses of the design and test method for questions one and two should be recognized:

1. The possibility exists that month 12 award dollar totals, which do not exceed the test value, are

partially influenced by factors which cause year-end spending. The test will not discriminate between year-end and normal influences on award totals in this situation.

2. The least squares method is particularly influenced by extreme values which can occur in time series data (11:266).

3. The form of the distribution of the deviations from the trend line could not be determined, therefore no parameters were specified upon which formal statistical inferences could be made.

4. The possibility exists that deviations from the trend line are not time-independent. If this is the case, the standard deviation may be understated (34:649).

Research Design and Test-Question Three

Objective

The objective of the design and test for question three was to determine which types of goods or services were purchased in higher than prevailing proportions in the last month of the year. Satisfaction of this objective requires:

1. Calculation of a last month proportion for each type of good or service purchased;

2. Determination of a prevailing proportion;

3. A test which determines which proportions are above that prevailing proportion.

Design

For each of the 27 types of goods and services purchased by the Air Force, the ratio of month 12 award dollars to the total award dollars for a given commodity was used as the last month proportion. This ratio was expressed as a percentage of total award dollars for a commodity, and calculated using the following formula:

$$\text{Commodity Percentage in month twelve} = \frac{\text{Commodity award dollars in month twelve}}{\text{Total commodity award dollars for the year}}$$

A similar ratio was computed for the total of Air Force awards for month 12. The USAF month 12 percentage was used as the measure of the prevailing proposition.

Test

The month 12 commodity percentages were compared to the USAF month 12 percentage for each year of the period FY '77-'80. If a commodity percentage exceeded the USAF percentage, that commodity was considered to have been purchased in a greater proportion than normal for the given year. If a commodity was identified as being purchased in a higher than normal proportion for more than two of the four years, it was concluded to be an item requiring further investigation in later studies of year-end spending.

Rationale

The USAF percentage is actually the weighted average of the commodity percentages, since USAF month 12 award

dollars are the aggregate of the individual commodity award dollars for the month. Calculation of commodity percentages allowed for the comparison of the individual commodity proportions with the average or prevailing proportion and facilitated analysis and presentation.

Assumption

This test is based on the assumption that, in the absence of some causitive factor, the month 12 percentage of award dollars for all commodities would be equal.

Strengths of Test

The following are the strengths of this test method:

1. The test will identify those commodities which are purchased in relatively higher proportions in month 12.

2. All USAF commodities, rather than a few suspect items, were subjected to the test.

Weaknesses of Test

The only weakness of the test is that it does not identify a year-end surge (as operationally defined) in the award pattern of a commodity. In fact, the methodology only identifies those commodities which should be further tested for year-end surge.

Summary of Assumptions

The following major assumptions were made in developing this research methodology:

1. The patterns of award dollars are adequate indicators of the pattern of activity in the procurement process.

2. The pattern of dollars awarded to U.S. business by the DOD is representative of the total DOD pattern of awarding contract dollars.

3. The pattern of dollars awarded to U.S. business by the USAF is representative of the total USAF pattern of awarding contract dollars.

4. The data extracted from the WHS and USAF 7102 reports were accurate.

5. DOD and Air Force awards for the first 11 months of the year are not influenced by the factors which cause year-end spending surge.

6. DOD and USAF award patterns for the period studied are the same or similar to the award pattern observed in the pilot study for FY '71-'76.

7. A linear function is a good descriptor of the trend in the award patterns of the populations.

8. The deviations from the trend line are time-independent.

9. In the absence of some causative factor, the month 12 percentage of award dollars for all commodities would be equal.

CHAPTER IV

ANALYSIS AND FINDINGS

Introduction

This chapter describes an analysis of data for DOD and USAF contracts awarded during fiscal years 1977 to 1980. The analysis was performed to answer research questions of Chapter II. This chapter describes the application of the Chapter III methodology, and the findings of the analysis. The mechanics of the analysis techniques are described together with any weaknesses or limitations found in the methods application. Also included are reproductions of the graphical products used during the analysis.

Use of the Statistical Package for the Social Sciences (SPSS)

The data analysis was aided by the use of the SPSS, a copyrighted software package that is widely used for statistical procedures and printout formats that may be selected by the user. Features of the software package were used to sort data, perform necessary calculations and provide printouts which enabled an analysis of the data.

The data were input to a memory device accessible to the SPSS prior to the analysis. The data were input in a time sequence format, beginning with the first month of the

first year by type of procurement activity or commodity class. The time related elements of the data were codified in a numerical form, i.e., October = 1, November = 2, etc., fiscal year 1977 = 1, 1978 = 2, etc. This format enabled the SPSS to identify the selected data and perform the procedures designated within the selected sub-programs.

The program shown in Exhibit W, Appendix D was used for data analysis for research question one and two. The program shown in Exhibit X of Appendix D was used for the analysis for research question three.

Analysis Procedures for Research Questions One and Two

Overview

The objectives of the analysis were to determine the magnitude of the year-end surge in the DOD, and to identify which USAF procurement activities experienced a year-end surge. The analysis required the testing of data for the total DOD contract awards, and for the four types of USAF procurement activities for each year of the four year period. Tests were also performed to analyze the total USAF contract awards data for the four year period because the USAF award totals were logically related to those of the DOD, and the USAF component procurement activities. Since the analysis required the testing of 28 data subsets, and because both objectives required the use of common methods,

the procedures used to accomplish the objectives were standardized to improve the efficiency of the analysis process.

Procedures

The analysis was performed using SPSS printouts, graphical products, and the methods described in Chapter III. The analysis was an iterative process containing the following procedures:

1. SPSS printouts containing the following information were obtained:

   a. The sum of the contract dollars awarded during the fiscal year. This and all other data used during the analysis were measured in 1972 constant dollar values.

   b. A tabular listing of the awards by month for each fiscal year. The listing indicated the dollar value and the percentage of total annual awards by month.

   c. The values for the A and B terms required for use of the trend line formula

$$y = A + BX .$$

   These values were computed by a regression testing feature of the SPSS that uses the least squares method. This feature also computed the value of the standard deviation of the observed (actual award) values about the trend line.

2. The data obtained from the SPSS were used to compute the maximum expected values of the awards during the first eleven months of the year, and to derive the maximum expected value for month twelve. The constant dollar values of the trend lines and the maximum expected values were converted into percentage values. The percentage values were computed on the basis of the total contract dollars awarded during the year, except for the tests described in procedure number 7.

3. The data obtained in steps 1 and 2 were plotted on graphs for further analysis.

4. The graphs were visually examined to determine whether the straight line of the least squares method adequately described the trend of the awards. This scrutiny was intended to determine whether the award pattern exhibited a persistent curvature and whether the data contained extremely large or small values which would affect the ability of the least squares method to determine the trend line.

5. The observed values of the contract awards were compared with the maximum expected values. If the observed value of the twelfth month exceeded the maximum expected value, the occurrence of a year-end surge was noted, and the magnitude of the surge was calculated by subtracting the maximum expected value from the observed value.

6. The above procedures were repeated using the data for the next three years of the four year period. If

it was found that year-end surge occurred in more than two of the four years, then it was determined that a year-end surge was characteristic of the contract award pattern of the DOD, USAF or USAF procurement activity.

7. The year by year analysis was supplemented through the use of composite graphs, and tests of the data depicted within these graphs. The graphs were constructed to provide a showing of the typical, or persistent, characteristics of the award patterns. The composites were not intended to supersede the analysis of the data by individual year, but rather, to augment that analysis. The construction of the composite graphs and the test of the related data used the same procedures described earlier, with the following exceptions:

1. The percentage values plotted were weighted averages of the dollar value of contracts awarded within the indicated month rather than a simple percentage of the annual total.

2. The regression tests used the constant dollar values for 44 months rather than 11.

3. The calculations of the average magnitude of the year-end surge included the twelfth month award values within years when a surge did not occur as well as those within years when a surge did occur. The difference in the calculations of the average magnitude of surge is related to the amount by which the last month award value was <u>below</u> the

maximum expected value. The procedures used with the composites calculated the last month award value and percentage of the total annual awards in the four years by taking a weighted average of the values above and below the maximum expected value; the other procedure averaged only the values above the maximum expected value.

Procedures for Research Question Three

Overview

The objective of this analysis was to determine which classes of goods and services were purchased in higher than prevailing proportions in the last month of the year. The last month proportion of a given class was defined to be the percentage of the total purchases for goods and services within a given class which were placed in the twelfth month of the fiscal year. The prevailing proportion of awards in the last month was defined to be the percentage of the total purchases placed for all classes of goods and services during the last month of the fiscal year. The analysis procedures were designed to enable a comparison of the percentage value related to a given class with weighted average percentage value prevailing among all classes on a month by month basis. Data for each of the four years were analyzed separately.

Description of the SPSS Cross-Tabulation Printouts

The data were analyzed primarily through the use of data tabulations constructed by the CROSSTABS feature of the

SPSS (35:Ch.16). The following description of the SPSS printouts is provided to assist the reader in understanding the procedures used in this analysis.

The SPSS produces tabulations of data arrayed in the matrix format shown in Exhibit I[1]. The tabulation shows the data of the 27 classes of goods and services, hereafter termed commodity classes, in 27 columns of the matrix. The data related to each of the twelve months of the fiscal year are shown in twelve rows. The intersection of a row and column creates a box, or matrix cell. Each cell contains three data items listed in the following top to bottom order:

1. Count: Indicates the amount of 1972 constant dollars awarded for a commodity class during a given month. The classes and months are identified by their respective row (month) and column (commodity) labels. For example, in Column 1, "aircraft" and row twelve "SEP", the count 968 would indicate that $968 million were awarded for aircraft in the September month.

2. Row Percentage: Indicates the percentage of awards by commodity class within the total of all contracts awarded during the month. The total contract dollars awarded during the month are indicated in the column labeled "ROW TOTAL", located in the right hand margin of the tabulation. For example, the cell of the first column and

[1]Exhibit I summarizes data for four years. It is pointed out here as an example of the SPSS printouts used to analyze the data for each year.

twelfth row indicates that, in September, $968 million were awarded for contracts for aircraft. During the month of September, the total dollars awarded for all commodity classes was $4721 million. The "Row Percentage" value indicates that 968 is 20.5 percent of 4721.

3. Column Percentage: Indicates the percentage of dollars awarded by month within the total of all contract dollars awarded for the commodity class. The total amounts of contract dollars awarded for each commodity class are listed in the row labeled "COLUMN TOTAL", located in the bottom margin of the tabulation. For example, the cell of the first column and twelfth row indicates that, in September, $968 million were awarded for contracts for aircraft. The total value of contract dollars awarded for aircraft (column total) was $7908 million. The column percentage indicates that968 is 12.2 percent of 7908. The "Column Percentages" for September would be the "last month proportion of awards" for a given class of commodities.

The tabulation provides additional data in its "COLUMN TOTAL" row and "ROW TOTAL" column. The "COLUMN TOTAL" row located in the bottom margin shows:

1. The sum of the column dollar values, i.e., the sum of the first column, indicates $7908 million were awarded for aircraft.

2. The value of 40591 shown in the bottom right hand corner of the tabulation indicates that the sum of all award dollars was $40,591 million.

3. The value listed at the bottom of the first column indicates that 7098 is 19.5 percent of 40,591, and that 19.5 percent of all the contract dollars were awarded to purchase aircraft.

The "row total" column located in the right hand margin of the tabulation shows:

1. The sum of the row contract dollar values, i.e., the sum of the dollar values in the September row indicates that $4721 million were awarded in that month.

2. The value of 40591 in the bottom right-hand margin indicates that a total of $40,591 million were awarded. for all purchases placed in all of the months.

3. The value of 11.6 listed in the September row indicates that 4721 is 11.6 percent of 40591, and that 11.6 of all contract dollars were awarded in September. The value of 11.6 percent would be the "prevailing proportion of awards during the last month" within this tabulation of data.

Tabulations of Data Aggregated Over the Four Year Period

A tabulation of the awards for the 27 commodity classes was constructed to measure the aggregate distribution of the awards during the twelve months of all four years. This procedure reduced the 1296 permutations down to a more comprehensible level of 324. This tabulation is presented in Exhibit I. The exhibit was constructed by use of the SPSS crosstab feature. The exhibited tabulation is similar to

those used in the analysis of the distribution of the awards within the 27 commodity classes by individual year with these exceptions:

1. The dollar values shown are aggregates of the awards by month and commodity class, i.e., the September awards for aircraft purchases made in fiscal years 1977, 78, 79, 80 were summed.

2. The percentage values are weighted averages.

Procedures

The analysis of the data indicating the distribution of the contract awards by commodity class for the last month was performed using an iterative process. The process contained the following procedures:

1. An SPSS printout containing a crosstabulation of the data by month and commodity class was obtained for each of the four fiscal years.

2. The percentage value listed in the September row of the "ROW TOTAL" column of the SPSS printout was identified as the "prevailing USAF proportion" of awards for all classes of commodities purchased in the last month of the fiscal year.

3. The column percentage value listed in the matrix cell of the September row of each commodity class column was identified as the "commodity proportion" of contract dollars awarded in the last month for that class of commodity, within

the total of all contract dollars awarded during the year for that class of commodity.

4. The commodity percentage was compared with the prevailing USAF percentage. If the commodity percentage was higher than the prevailing USAF percentage, then the commodity class was identified as a class in which the proportion of contract dollars awarded at year-end was higher than the USAF prevailing proportion of contract dollars awarded at the year-end.

5. The above procedures were iterated for each of the four years.

6. If a commodity percentage was found to be higher than the prevailing USAF percentage of awards for more than two years, then the commodity class was identified as one in which a higher proportion of contract dollars were awarded at the year-end on a consistent basis.

7. Once a commodity class had been identified as a "consistent" class within the definition described in 5 above, then a further identification was made of:

(a) The aggregate dollar amount awarded for that commodity class in the last month of the four fiscal years;

(b) The total dollar amount awarded for that class during all months of the fiscal years;

(c) The procurement activity which predominately awarded the contracts for those commodity classes during the last month of the fiscal years.

Findings Applicable to Research Question One

Finding Number One: Total DOD Contract Awards

The percentage value of the DOD contract dollars awarded in the twelfth month of each of the four fiscal years are in excess of the maximum expected value (See Exhibit A). The average magnitude of surge was 6.95 percent.

Fiscal Year	1977	1978	1979	1980
September value	14.1	14.0	17.0	16.5
Maximum Expected value	7.98	9.32	7.67	8.85
Surge	6.12	4.68	9.33	7.65

Average surge 6.95

None of the contract award percentage values for other months exceeded the maximum expected value.

Findings Applicable to Research Question Two

Finding Number One: Total USAF Contract Awards

The percentage value of the USAF contract dollars awarded in the twelfth month of fiscal years 1977, 1979 and 1980 exceed the maximum expected values. The maximum expected values were not exceeded in fiscal year 1978 (See Exhibit B). The average magnitude of the surge was 2.01 percent.

Fiscal Year		1977	1978	1979	1980
September value		10.8	9.7	14.6	12.1
Maximum expected value		8.56	10.49	10.16	10.75
Surge		2.24	.0	4.44	1.35
Average surge	2.01				

Other months of the fiscal years in which the award percentage values exceeded the maximum expected values were: April, FY 1977 (11.6%); and November, FY 1979 (17.5%).

Finding Number Two: USAF Central Procurement Activities

The percentage value of the central procurement activity contract dollars awarded in the last month of the four fiscal years did not exceed the maximum expected value (See Exhibit C).

Fiscal Year	1977	1978	1979	1980
September value	9.8	8.0	13.2	11.1
Maximum expected value	11.19	14.14	13.48	14.44
Surge	.0	.0	.0	.0

Other months of the fiscal years in which the award percentage values exceeded the maximum expected values were: April, FY 1977 (13.4%); June, FY 1978 (15.2%); November, FY 1979 (21.6%).

It was obvious that the unusually high value of 21.6 percent observed in November, FY 1979 increased the maximum expected values for the fiscal and thereby probably invalidated the test results for that fiscal year. However, the

November value for FY 1979 did not affect the test for the other three years, and therefore, it did not alter the overall findings. The possibility of encountering an anomaly, such as the November value, was precisely the reason why four years, rather than one, were tested.

Finding Number Three: USAF Research and Development (R&D) Procurement Activities

The percentage value of the USAF R&D procurement activity contract dollars awarded during the twelfth month of fiscal years 1979 and 1980 exceeded the maximum expected values (See Exhibit D). In fiscal years 1977 and 1978, the twelfth month values were .14 and .003 percentage points below the maximum expected values. The average magnitude of the surge was 1.84 percent.

Fiscal year	1977	1978	1979	1980
September value	7.5	11.36[2]	16.2	10.8
Maximum expected value	7.66	11.39	9.30	10.36
Surge	.0	.0	6.90	.44

Average Surge 1.835

The percentage value of the contract dollars awarded in October of fiscal year 1978 (24.1%) appears to be anomalous to the characteristics of the award patterns. In this instance the anomaly not only affected the analysis for the

[2]Normally, the values shown and used in the analysis were rounded to the nearest one-tenth percentage point, however, these values for the R&D activity for FY 1978 were too close to differentiate at the one-tenth percent level.

single year, but moreover, it affected the outcome of the findings decision governed by the rule which related to situations wherein only two of the four years were found to contain year-end surges. The rule specified that procurement activities found to experience surges in only two of four years would not be concluded to characteristically have year-end surges. To resolve the dilemma created by the anomaly in the data, the authors drew upon the tests of the composite graphs. The composite graph shown in Figure 4 of Exhibit G shows that a year-end surge was a persistent characteristic of the USAF R&D procurement activities. The composite graph showed that the weighted average percentage value of contract dollars awarded during the September month of the four years was 11.3 percent. The maximum expected value was 9.54 percent. The weighted average surge was 1.76 percent. Graphs of the R&D award patterns are presented in Exhibit D.

Finding Number Four: USAF Base Procurement Activities

The percentage value of the USAF base procurement activity contract dollars awarded in the last month of the fiscal year exceeded the maximum expected value in each of the four fiscal years (See Exhibit E). The average magnitude of the surge was 9.36 percent.

Fiscal year	1977	1978	1979	1980
September value	18.3	15.9	20.4	19.1
Maximum expected value	9.99	8.54	9.37	8.35
Surge	8.31	7.36	11.03	10.73

Average surge 9.36

The percentage values for the contract dollars awarded in other months of the fiscal years did not exceed the maximum expected values.

Finding Number Five: USAF Central (Other) Procurement Activities

The percentage value of the USAF Central (other) procurement activity contract dollars awarded in the last month of the fiscal year did not exceed the maximum expected value during the four fiscal years (See Exhibit F).

Fiscal year	1977	1978	1979	1980
September value	5.2	1.7	3.1	3.6
Maximum expected value	23.86	10.63	4.37	12.61
Surge	.0	.0	.0	.0

The percentage value of contract dollars awarded in October of the following fiscal years exceeded the maximum expected values indicated.

Fiscal year	1977	1978	1980
October value	62.4	42.3	36.4
Maximum expected value	55.02	40.78	34.84

The extremely high values of the October months obviously distorted the maximum expected values for these three years, thereby rendering the test ineffective.

The distorting influence of the October award values also rendered the analysis of the composite graphs ineffective as an objective means of determining whether or not a surge occurred in the contract awards of the central other

procurement activities. In this situation, the authors concluded that no surge occurred in this activity. The weighted average percentage of contract dollars awarded in the twelfth month was a 3.4 percent, a value exceeded in 8 of the 11 prior months, and only 1.3 percent above the lowest weighted average value shown for the months in the composite graph presented in Figure 6 of Exhibit G.

Evaluation of Methodology for Research Questions One and Two

In the process of the analysis, 288 separate dollar values related to contract awards were tested. Of these 288, 264 were related to contract dollars awarded during the first eleven months of the fiscal year, and 24 were related to contract dollars awarded in the twelfth month of the fiscal year. Of the 264 values, 9 (3.4%) were above the maximum expected value; 13 (54.2%) of the 24 values were above the maximum expected values. In none of the sets of data related to any organization or activity were more than 3 (6.82%) of the 44 values related to awards made in the first eleven months of the fiscal year found to be in excess of the maximum expected values. In none of the sets of data related to any organization or activity were less than 3 (6.25%) or more than 5 (10.41%) of the 48 values found to be above the maximum expected value.

The "experimental probabilities" of these occurrences were calculated to determine the approximate strength

of the analysis method (38:201-210). The calculations indicated that 22/288, or 7.64 percent of the values exceeded the maximum expected value. The probability of finding one of the twelve values in excess of the maximum expected value was calculated to have been 60.46 percent. The probability of finding the last month award value to be in excess of the maximum expected value in more than two of the four years was calculated to be .000175 percent. Therefore, there was a 60.46 percent probability that the test would find the high value in the twelve months. The high value might occur in September, or an earlier month. However, there was only a .000175 percent probability that the values for September would be found to have exceeded the maximum expected value in more than two of the four years. Yet, the test found that this improbable condition existed in the DOD, total USAF, and USAF base procurement contract award data. The test showed that the last month awards values were not only higher than those of the earlier months, but that they were higher to a highly improbable degree.

The analysis method was found to be relatively ineffective for measuring the surge within a set of data containing characteristics similar to that of USAF Central (other) procurement activities. However, even under these conditions, the test is deemed to be more effective than tests which do not consider the trend in the data because, if the unusual value occurs in the early months of the year,

the trend line will be adjusted for a downward slope, thereby focusing more narrowly upon the necessarily smaller award values which would predictably occur in the later months. The authors concluded that the analysis method was more effective than other previously used methods which compared the last month value with the mean value of the first eleven months.

Findings Applicable to Research Question Three

Finding Number One: USAF Classes of Commodities Purchased in Higher Proportions at the Year-end

The analysis found that contract dollars for 11 of the 27 classes of commodities were consistently awarded in proportions above the prevailing USAF proportion of total dollars awarded during the year-end. The classes of commodities are identified in Exhibit H. Four classes of commodities were consistently purchased in higher proportions in each of the four years. Another seven classes of commodities were consistently purchased in higher proportions in three of the four years. These eleven classes of commodities are described on the following page. The information used in the descriptions was taken from Exhibit I.

CLASSES OF COMMODITIES CONSISTENTLY PURCHASED IN HIGHER PROPORTIONS (PERCENTAGES) DURING SEPTEMBER FOR FISCAL YEARS 1977 THROUGH 1980

COMMODITY CLASS	SEPTEMBER[1] PERCENTAGE	DOLLAR VALUE[2] OF LAST MONTH AWARDS (4 YRS)	DOLLAR VALUE[2] OF TOTAL AWARDS (4 YRS)	ACTIVITY AWARDING THE CONTRACTS IN LAST MONTH
1. Awards under $10,000	13.8	523	3,778	Base 92.27%
2. Construction	43.2	397	919	Base 93.79%
3. Materials handling equipment	31.0[3]	14	46	Central 77.45%; Base 21.99%
4. Ships (Naval equipment)	79.4[4]	5	7	Central 99.28%
CLASSES OF COMMODITIES PURCHASED IN HIGHER LAST MONTH PERCENTAGES DURING THREE OF THE FOUR YEARS				
1. Electronic equipment	13.6	1,058	7,767	Central 80.5%; R&D 14.19%
2. Missiles	12.9	791	6,125	R&D 73.88%; Central 25.7%
3. All other	15.4	100	647	Central 49.46%; Base 46.82%
4. Production equipment	22.6[5]	6	29	Central 98.08%
5. Medical supplies and equipment	18.4	2	12	Base 100%
6. Building supplies	25.3	2	6	Base 99.61%
7. Separate containers and handling equipment	31.5	.3	1	1977 Base 100% 1978 Base 100% 1979 Ø 1980 Central 100%

[1]Values are weighted average percentages; [2]All dollars are in millions of 1972 constant dollars; [3]Percentage in FY 1980 was 52.3 (See Exhibit J); [4]Percentage in FY 1978 was 90.4 (See Exhibit J); [5]Percentage in FY 1977 was 5.1%, 47.5% in FY 1978.

Corollary Findings

Finding Number One: Similarity of DOD and USAF Contract Award Patterns

The general characteristics of the USAF contract award patterns are similar to those of the DOD.[3] The award patterns are observed to exhibit a bathtub shape, i.e., a high front which slopes down to a relatively level base and rises sharply at the back, or end, of the form. This observation is made on the basis of Figures 1 and 2 of Exhibit G. The significance of the observations is related to the determination of the degree to which the USAF and DOD share common policies and practices which would influence the patterns of the contract awards.

Finding Number Two: The USAF Procurement Activities Exhibit Unique Contract Award Patterns

The USAF Base, Central, Central (other), and R&D procurement activities do not exhibit similar award patterns. The dissimilarity of the patterns is shown in Figures 3, 4, 5 and 6 of Exhibit G. The significance of this finding is related to the determination of the factors which cause a year-end surge and to the formulation of year-end surge control measures.

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[3] A simple linear regression of the two sets of values shown in the graphs indicates a coefficient of correlation of .81 (30:373), and a coefficient of rank correlation of .90 (38:376).

Other Findings

Finding Number One: Influence of Base Procurement on USAF Year-end Surge

The USAF Base procurement activities have had an escalating influence upon the magnitude of the year-end surge within the total dollar value of USAF contracts awarded at the year-end. The total 1972 constant dollar value of the contracts awarded by the USAF during fiscal years 1977 through 1980 were distributed within the USAF procurement activities as follows: Central: $25,255 million (62.3%); R&D: $8,279 million (20.4%); Base: $5,930 million (14.6%); Central (other): $1,049 million (2.6%).

However, during the last month of the fiscal year the distribution was: Central: $2,652 million (56.2%); Base: $1,095 million[4] (23.2%); R&D: $938 million (19.9%); and Central (other): $35 million (.8%). The data showed that even during the last month of the fiscal years, when the total dollar value of the contract awards was increased, the surge in the base procurement activity was sufficiently large to have captured an additional ten percent share of the total dollars awarded for the month.

The above information was drawn from an SPSS cross-tabulation of the USAF contract awards tabulated by fiscal

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[4] Construction contracts accounted for 36% of this amount, and small purchases (under $10,000) accounted another for 47.76% of the base procurement activity awards in the last month of the fiscal years (See finding number one, research question three).

month and type of procurement activity. The row percentage values of this crosstabulation have been abstracted in Exhibit J. The exhibit shows the percentage of total dollar awards by procurement activity and fiscal month, together with a bar graph indicating the percentage distribution of the total awards by month and activity.

Finding Number Two: Lack of Seasonal Influence on Award Patterns

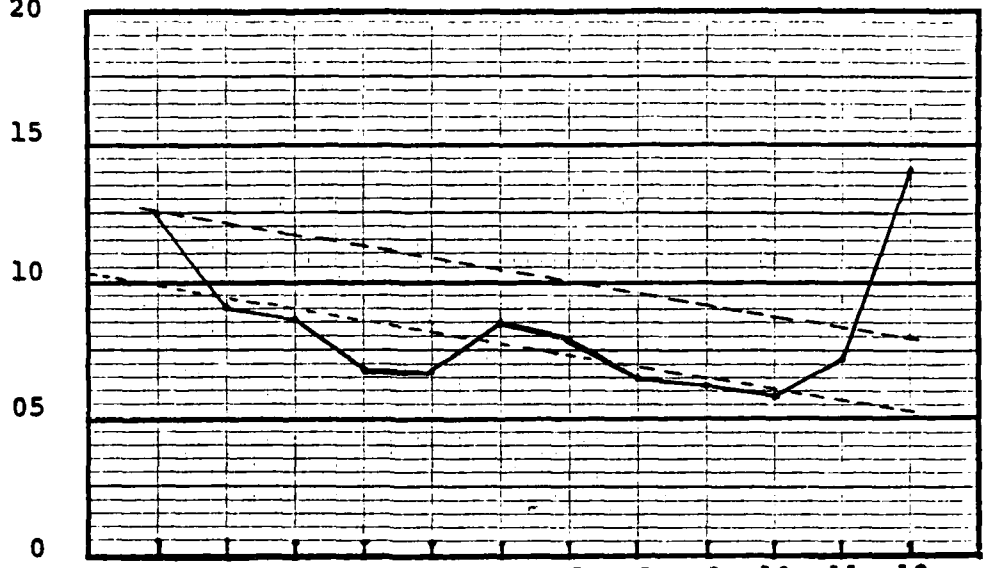
The twelfth month dollar value of contracts awarded by the DOD is not increased by the natural seasons of the calendar year. A visual examination of composite graphs of the DOD contract award for fiscal years 1972 through 1980 did not indicate any changes in the award patterns that were evidently attributable to natural seasons, i.e., winter, summer, etc. Moreover, the three month shift in the fiscal years after 1977 did not appear to have altered the patterns significantly. This finding is supported by the graphs of Figures 1 and 2 of Exhibit K.

The indifference of the award patterns to the influences of the natural seasons was more clearly shown by Figures 3 and 4 of Exhibit K. The graphs display exactly the same data shown in Figures 1 and 2, but these graphs, of Figures 3 and 4, were plotted in a calendar year, rather than in a fiscal year sequence. The graphs provided no evidence that the natural seasons influenced the award pattern.

The only months which appeared to retain the same pattern features are the months of February and March. However, the graphs did clearly indicate the influence of the Federal fiscal year (and presumably, the budget) cycle on the contract award dollar values during the calendar year. The graphs indicated that between 33.4 and 35.9 percent of the DOD contract dollars were awarded in the successive twelfth, first, and second months of the fiscal year. This data indicated that the predominant factor influencing the contract awards was the federal budget cycle.

PERCENT OF AWARDS BY FISCAL MONTH

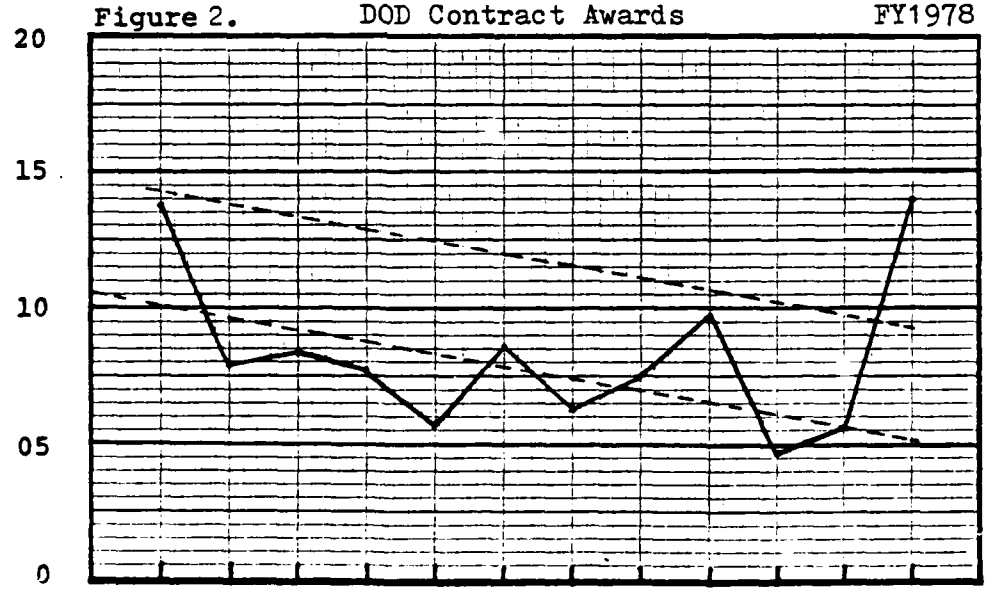
Figure 1. DOD Contract Awards FY1977



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	12.5	9.1	8.6	6.8	6.7	8.5	7.9	6.5	6.2	5.8	7.2	14.1

A 10.33 % B -.42 % sYd 1.34 % Limit 7.98 %

Figure 2. DOD Contract Awards FY1978

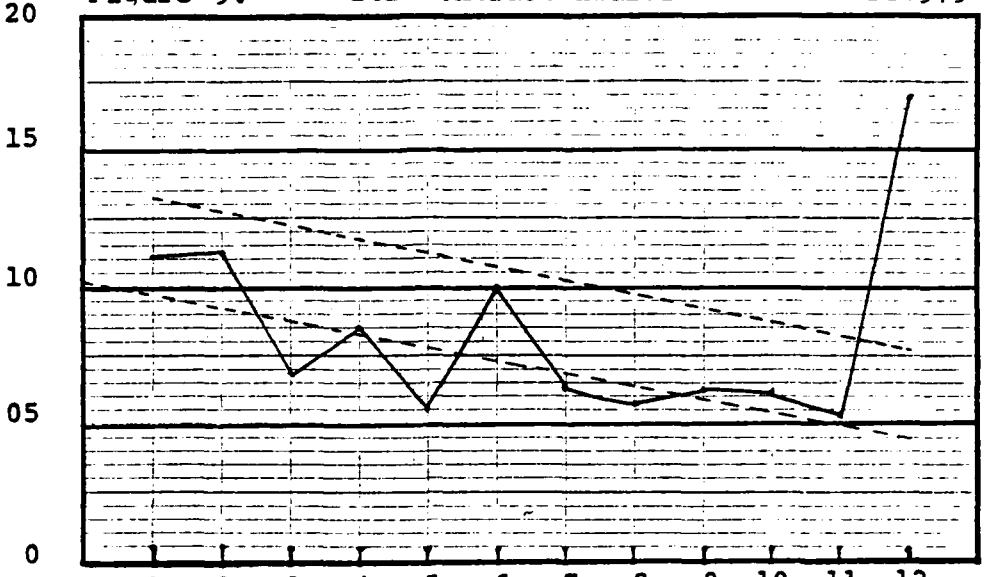


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	13.8	7.9	8.4	7.7	5.7	8.6	6.3	7.5	9.7	4.7	5.6	14.0

A 10.53 % B -.45 % sYd 2.10 % Limit 9.32 %

PERCENT OF AWARDS BY FISCAL MONTH

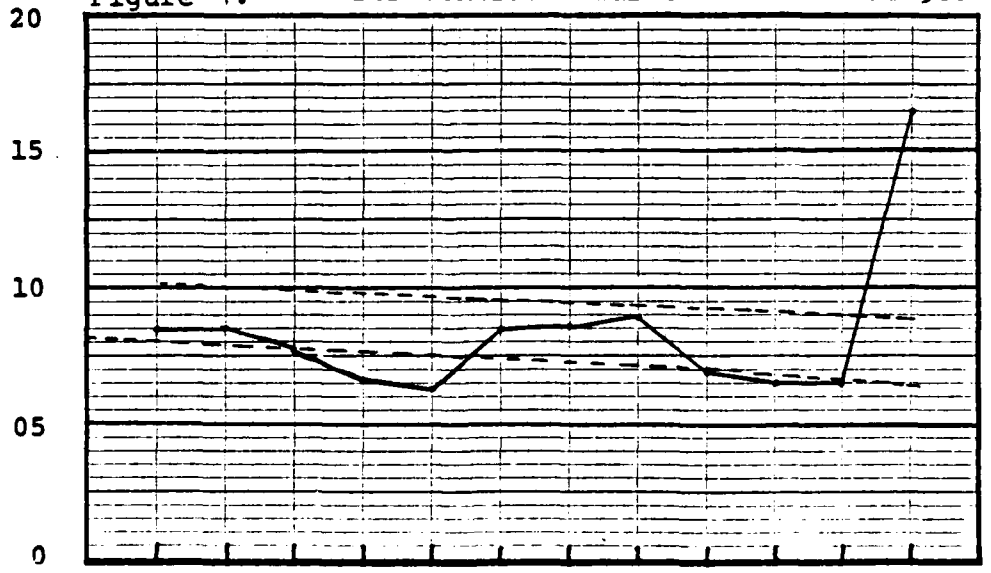
Figure 3. DOD Contract Awards FY1979



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	11.1	11.2	6.9	8.5	5.5	10.0	6.3	5.8	6.3	6.1	5.3	17.0

A 10.58 % B -.51 % sYd 1.58 % Limit 7.67 %

Figure 4. DOD Contract Awards FY1980

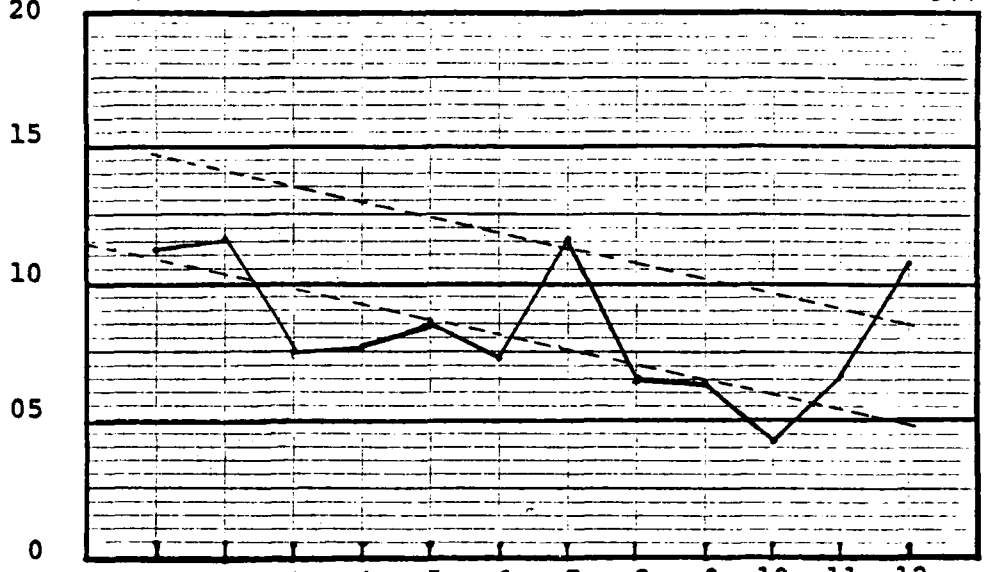


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	8.5	8.5	7.8	6.6	6.3	8.5	8.6	8.9	6.9	6.5	6.5	16.5

A 8.32 % B -.12 % sYd .99 % Limit 8.85 %

PERCENT OF AWARDS BY FISCAL MONTH

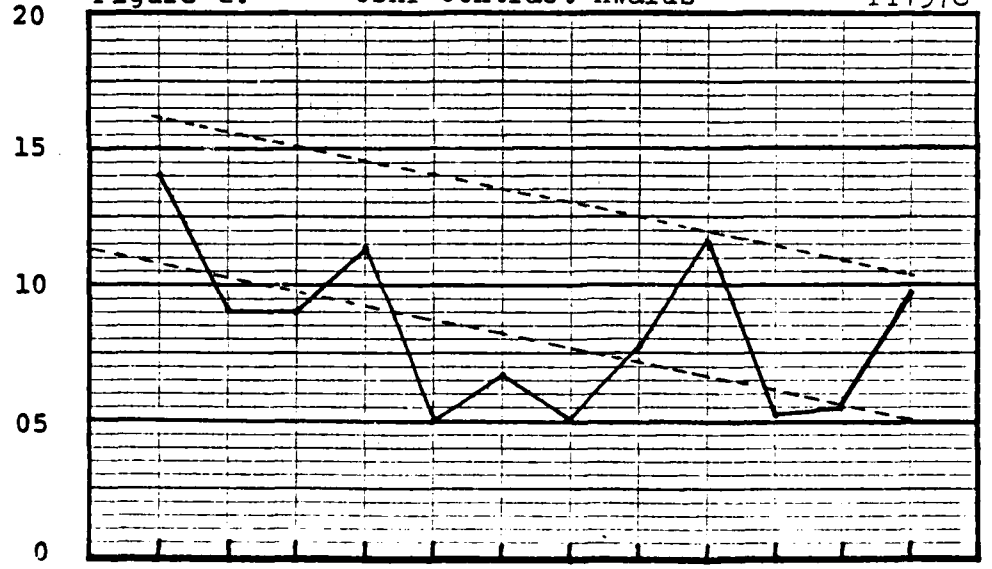
Figure 1. USAF Contract Awards FY1977



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	11.2	11.5	7.5	7.6	8.5	7.3	11.6	6.5	6.4	4.3	6.7	10.8

A 11.45 % B -.55 % sYd 1.86 % Limit 8.56 %

Figure 2. USAF Contract Awards FY1978

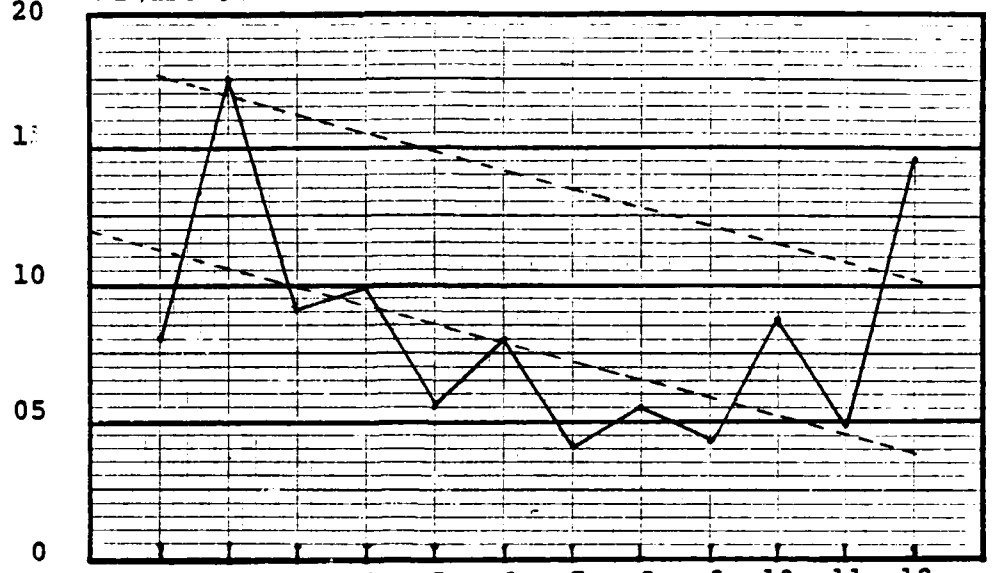


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	14.0	9.1	9.0	11.4	5.0	6.7	5.1	7.8	11.6	5.2	5.5	9.7

A 11.32 % B -.52 % sYd 2.70 % Limit 10.49 %

PERCENT OF AWARDS BY FISCAL MONTH

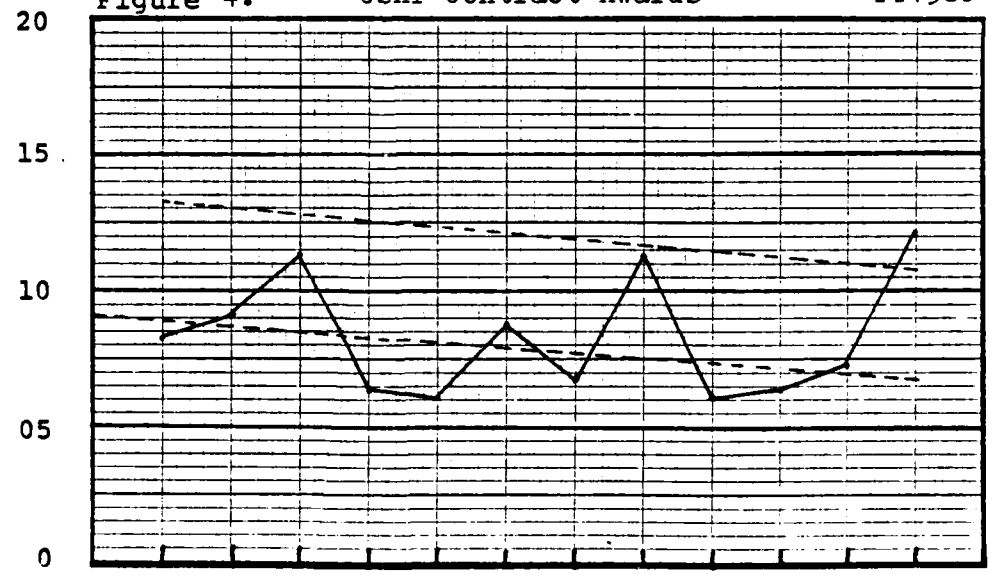
Figure 3. USAF Contract Awards FY1979



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	8.0	17.5	9.0	10.0	5.5	8.0	4.1	5.5	4.3	8.7	4.9	14.6

A 11.83 % B -.68 % sYd 3.25 % Limit 10.16 %

Figure 4. USAF Contract Awards FY1980

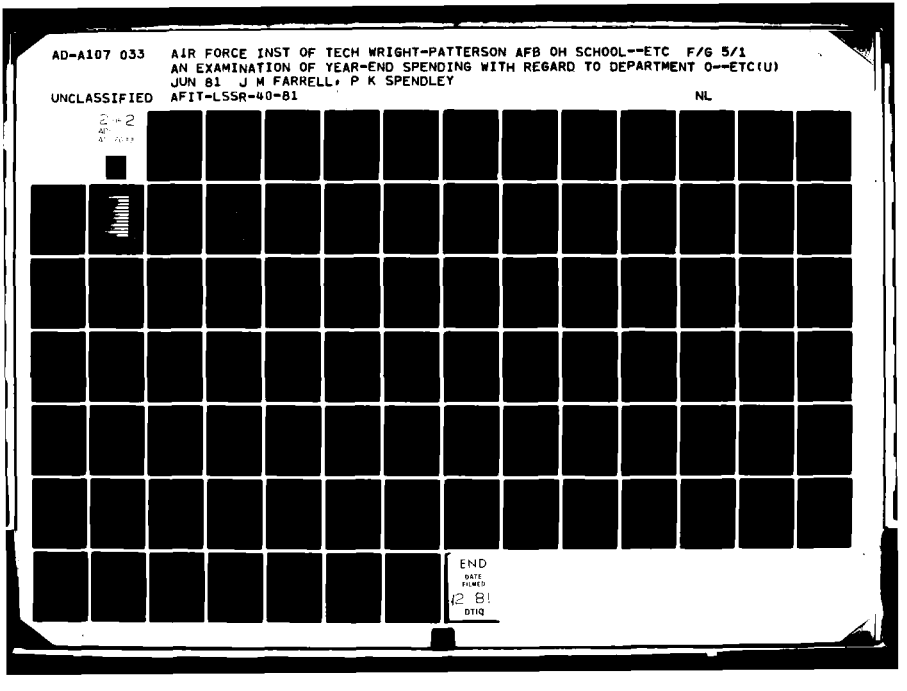


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	8.3	9.1	11.3	6.4	6.1	8.8	6.7	11.4	6.1	6.4	7.3	12.1

A 9.10 % B -.19 % sYd 1.97 % Limit 10.75 %

Exhibit B

AD-A107 033 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/1
AN EXAMINATION OF YEAR-END SPENDING WITH REGARD TO DEPARTMENT O--ETC(U)
JUN 81 J M FARRELL, P K SPENDLEY
UNCLASSIFIED AFIT-LSSR-40-81 NL



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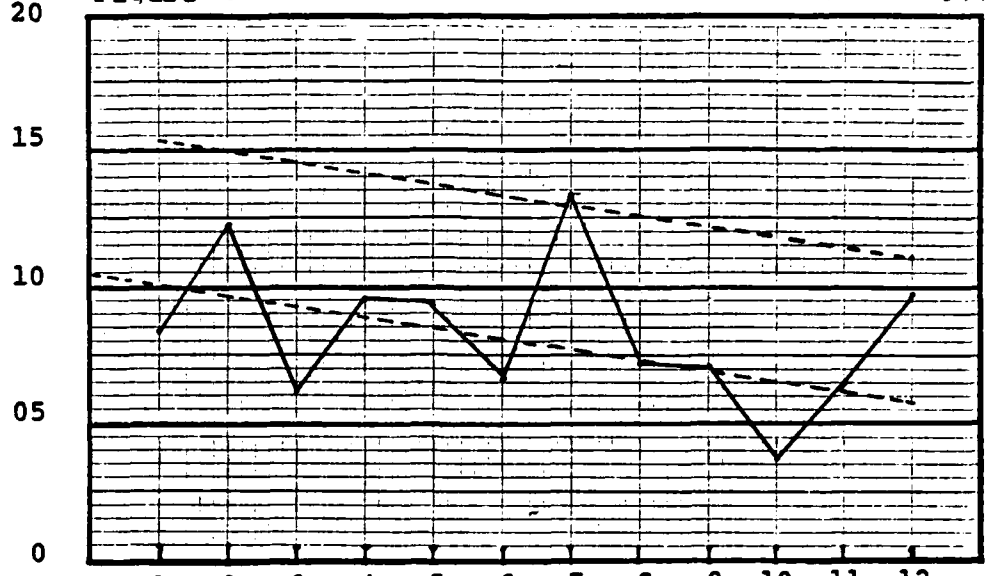
PERCENT OF AWARDS BY FISCAL MONTH

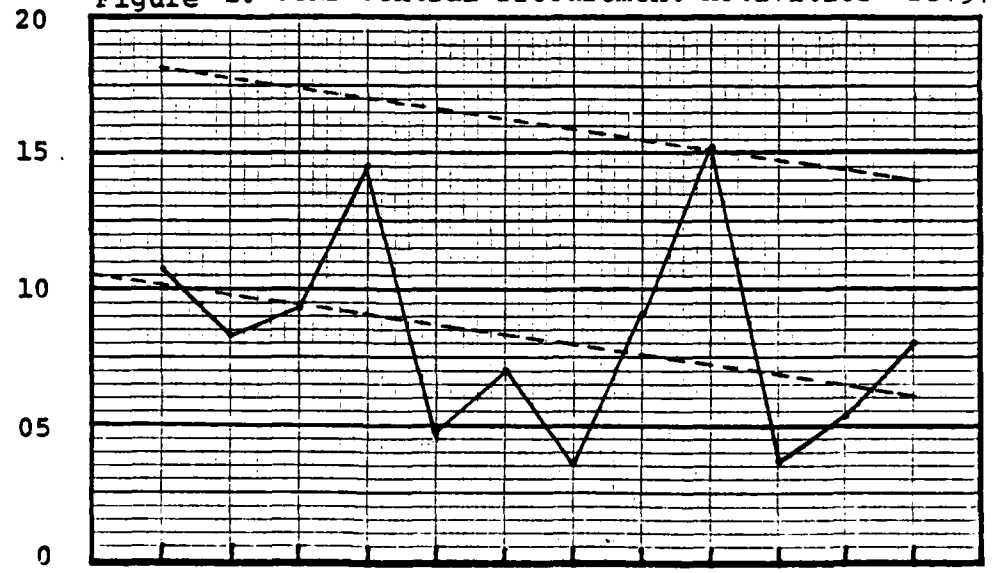
Figure 1. USAF Central Procurement Activities FY1977



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	8.4	12.2	6.2	9.5	9.4	6.6	13.4	7.2	7.1	3.7	6.5	9.8

A 10.47 % B -.38 % sYd 2.64 % Limit 11.19 %

Figure 2. USAF Central Procurement Activities FY1978

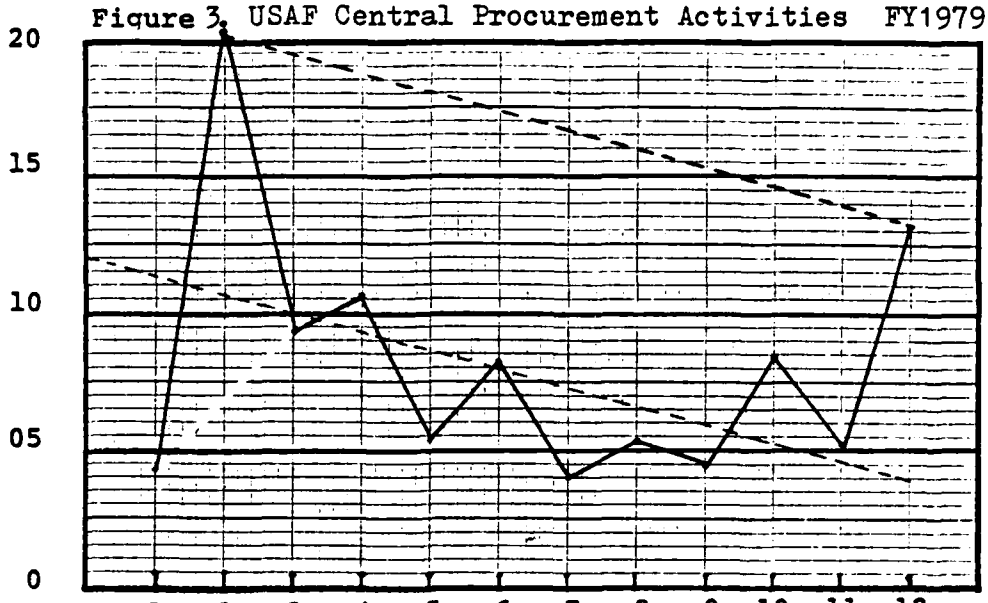


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	10.8	8.3	9.4	14.5	4.8	7.0	3.6	9.1	15.2	3.7	5.4	8.0

A 10.55 % B -.37 % sYd 4.01 % Limit 14.14 %

PERCENT OF AWARDS BY FISCAL MONTH

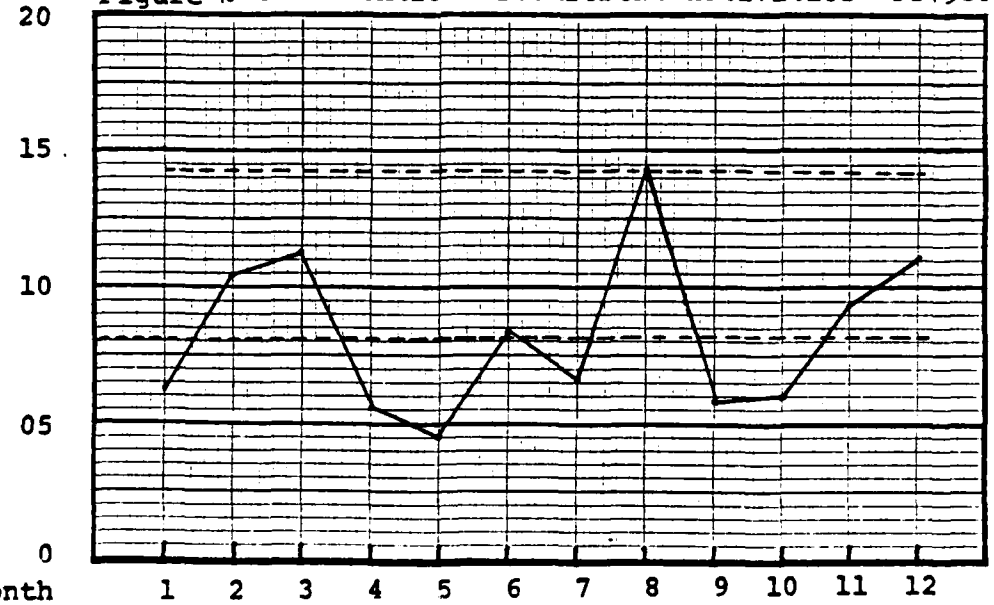
Figure 3. USAF Central Procurement Activities FY1979



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	4.3	21.6	9.3	10.6	5.4	8.2	4.0	5.3	4.5	8.5	5.2	13.2

A 11.94 % B -.67 % sYd 4.79 % Limit 13.48 %

Figure 4. USAF Central Procurement Activities FY1980

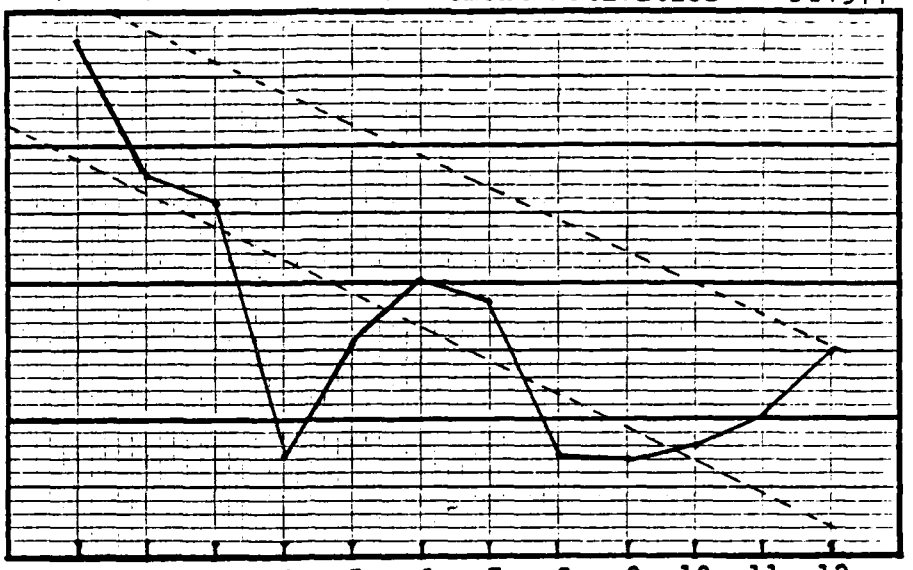


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	6.3	10.5	11.2	5.6	4.6	8.4	6.6	14.4	5.8	6.0	9.4	11.1

A 8.01 % B .01 % sYd 3.16 % Limit 14.44 %

PERCENT OF AWARDS BY FISCAL MONTH

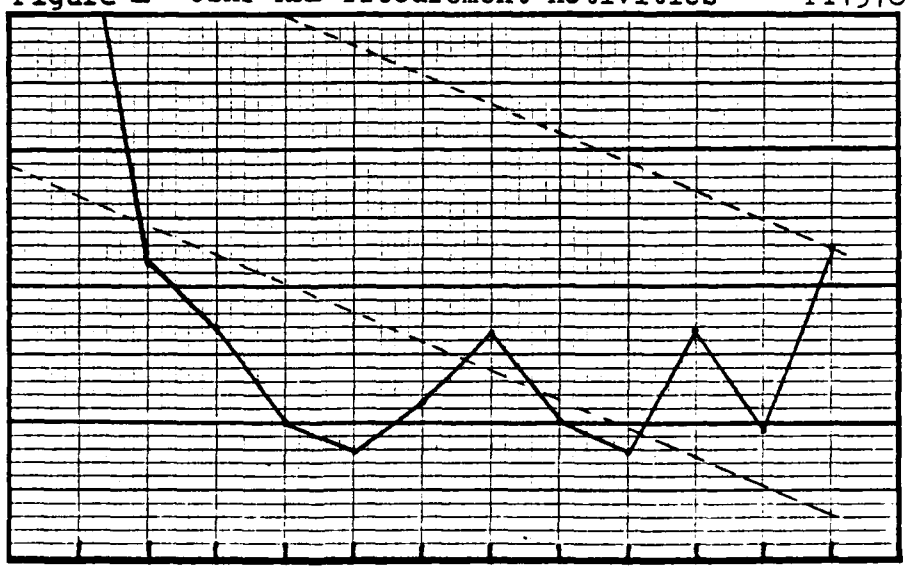
Figure 1. USAF R&D Procurement Activities FY19'7



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	18.8	13.9	12.8	3.6	7.8	10.1	9.3	3.7	3.5	4.0	5.1	7.5

A 15.73 % B -1.22 % sYd 3.29 % Limit 7.66 %

Figure 2. USAF R&D Procurement Activities FY1978

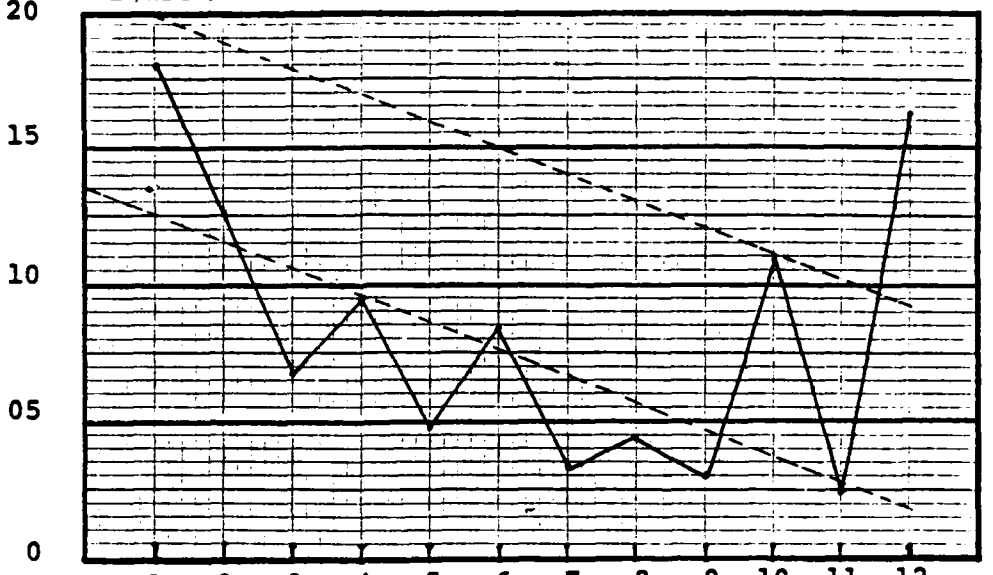


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	24.1	10.9	8.5	5.0	3.9	5.7	8.3	5.1	3.9	8.4	4.7	11.4

A 14.39 % B -1.06 % sYd 4.86 % Limit 11.39 %

PERCENT OF AWARDS BY FISCAL MONTH

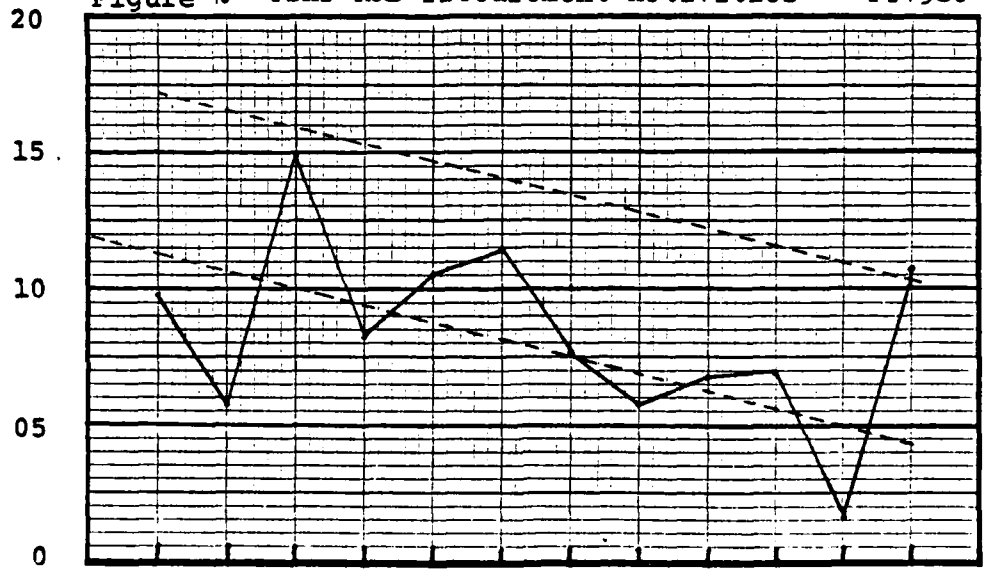
Figure 3. USAF R&D Procurement Activities FY1979



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	18.0	12.6	6.7	9.4	4.9	8.4	3.3	4.4	3.0	10.9	2.4	16.2

A 13.51 % B -.98 % sYd 3.78 % Limit 9.30 %

Figure 4. USAF R&D Procurement Activities FY1980

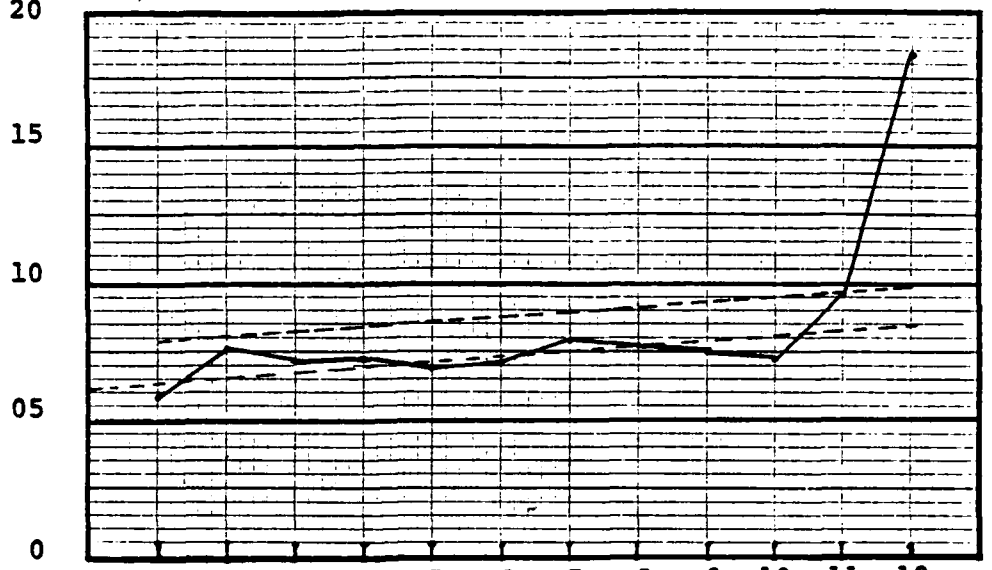


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	9.8	5.7	14.9	8.2	10.5	11.4	7.6	5.8	6.8	6.9	1.6	10.8

A 11.82 % B -.62 % sYd 2.99 % Limit 10.36 %

PERCENT OF AWARDS BY FISCAL MONTH

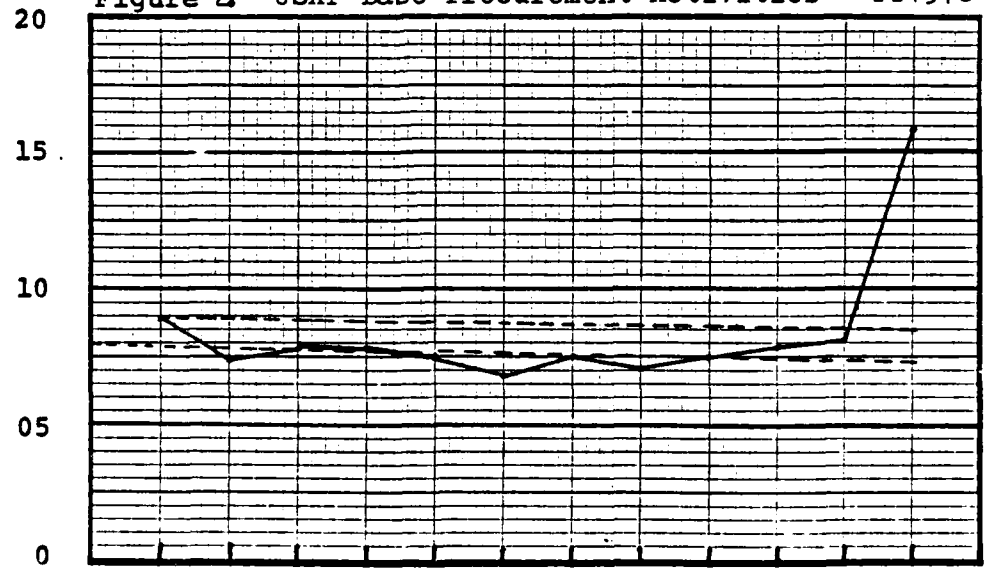
Figure 1. USAF Base Procurement Activities FY1977



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	5.8	7.6	7.2	7.3	6.9	7.1	7.9	7.7	7.5	7.2	9.6	18.3

A 6.31 % B .19 % sYd .70 % Limit 9.99 %

Figure 2. USAF Base Procurement Activities FY1978

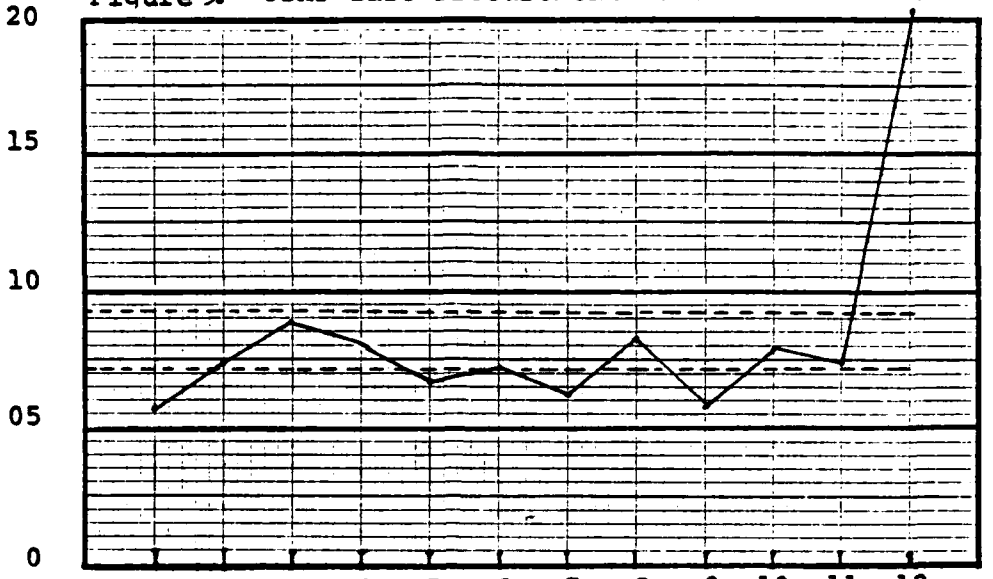


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	8.9	7.4	7.8	7.8	7.5	6.8	7.5	7.1	7.5	7.9	8.1	15.9

A 7.90 % B -.04 % sYd .56 % Limit 8.54 %

PERCENT OF AWARDS BY FISCAL MONTH

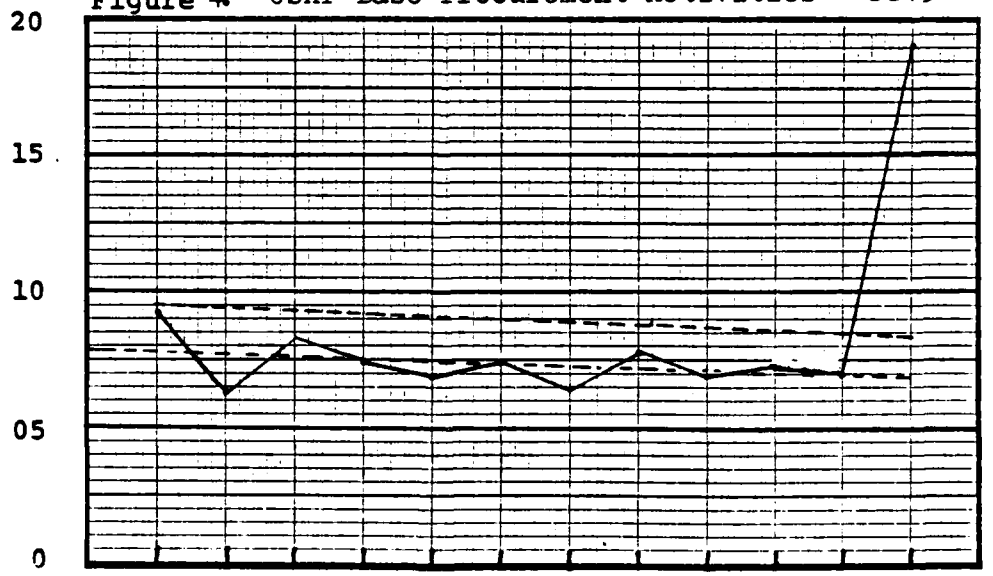
Figure 3. USAF Base Procurement Activities FY1979



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	5.8	7.4	8.9	8.1	6.7	7.2	6.2	8.2	5.8	7.9	7.4	20.4

A 7.21 % B .00 % sYd 1.08 % Limit 9.37 %

Figure 4. USAF Base Procurement Activities FY1980



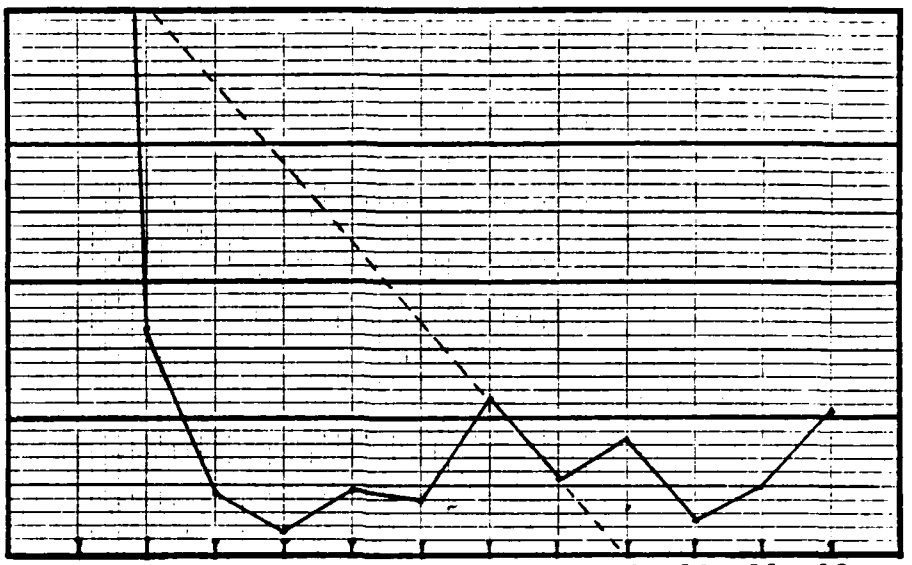
Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	9.2	6.3	8.2	7.4	6.9	7.4	6.4	7.8	6.9	7.3	7.0	19.1

A 7.93 % B -.10 % sYd .81 % Limit 8.35 %

PERCENT OF AWARDS BY FISCAL MONTH

USAF Other

Figure 1. Central Procurement Activities FY1977

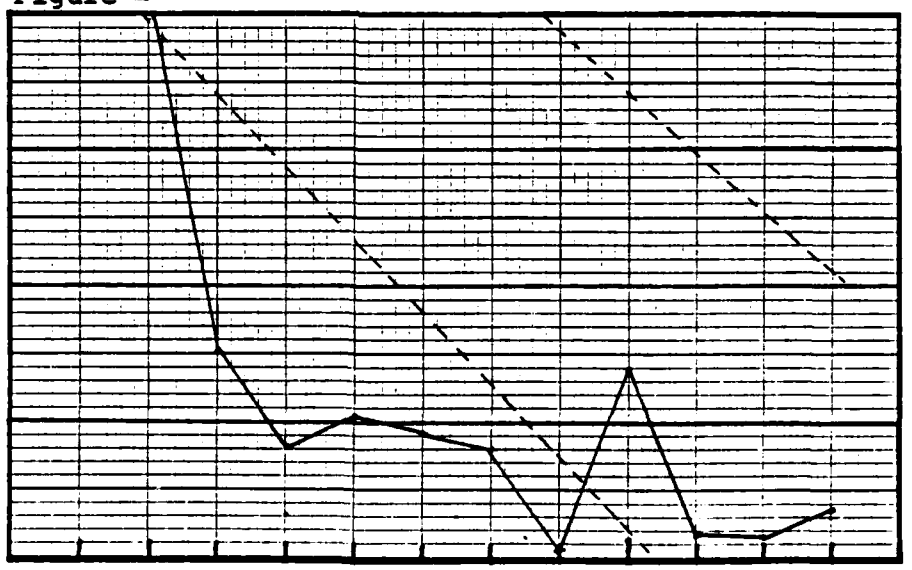


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	62.4	8.2	2.2	0.7	2.4	2.0	5.7	2.8	4.2	1.8	2.5	5.2

A 25.61 % B -2.83 % sYd 16.12 % Limit 23.86 %

USAF Other

Figure 2. Central Procurement Activities FY1978

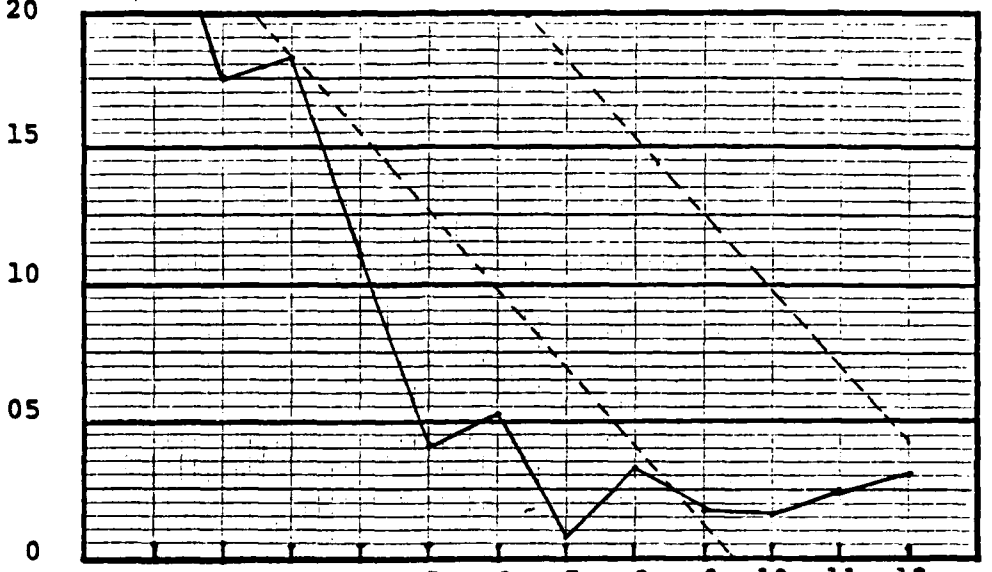


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	42.3	21.5	7.6	4.1	5.2	4.6	4.1	0.3	7.0	0.8	0.7	1.7

A 25.36 % B -2.74 % sYd 9.08 % Limit 10.63 %

PERCENT OF AWARDS BY FISCAL MONTH

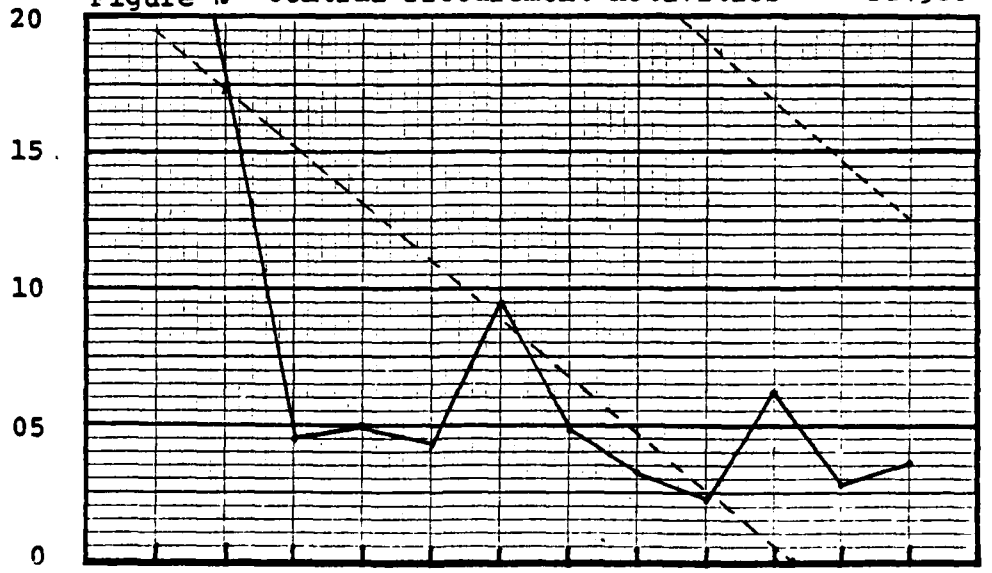
USAF Other
Figure 3. Central Procurement Activities FY1979



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	31.1	17.5	18.2	11.0	4.1	5.2	0.7	3.3	1.8	1.6	2.5	3.1

A 23.78 % B -2.50 % sYd 5.30 % Limit 4.37 %

USAF Other
Figure 4. Central Procurement Activities FY1980

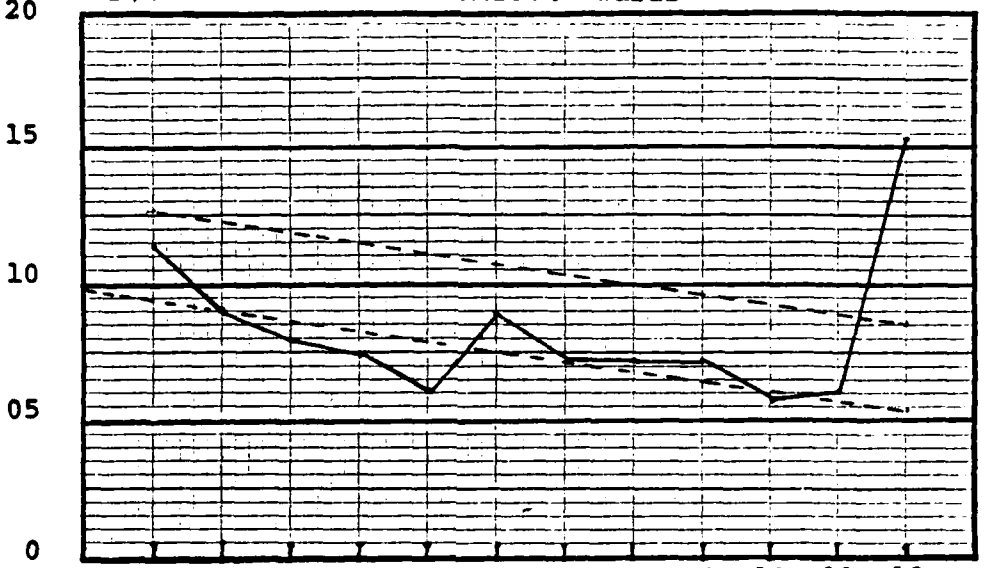


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	36.4	17.5	4.5	5.0	4.3	9.5	4.9	3.2	2.3	6.2	2.8	3.6

A 20.90 % B -2.02 % sYd 7.98 % Limit 12.61 %

PERCENT OF AWARDS BY FISCAL MONTH

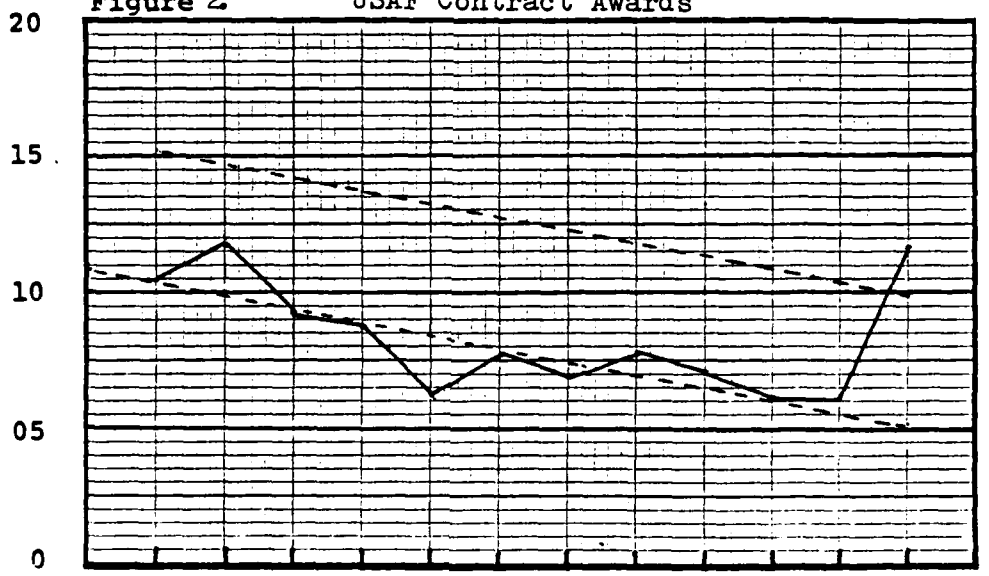
Figure 1. Composite of FY1977-1980 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	11.4	9.1	7.9	7.4	6.1	8.9	7.3	7.2	7.3	5.8	6.1	15.4

A 9.91 % B -.37 % sYd 1.54 % Limit 8.55 %

Figure 2. Composite of FY1977-1980 USAF Contract Awards



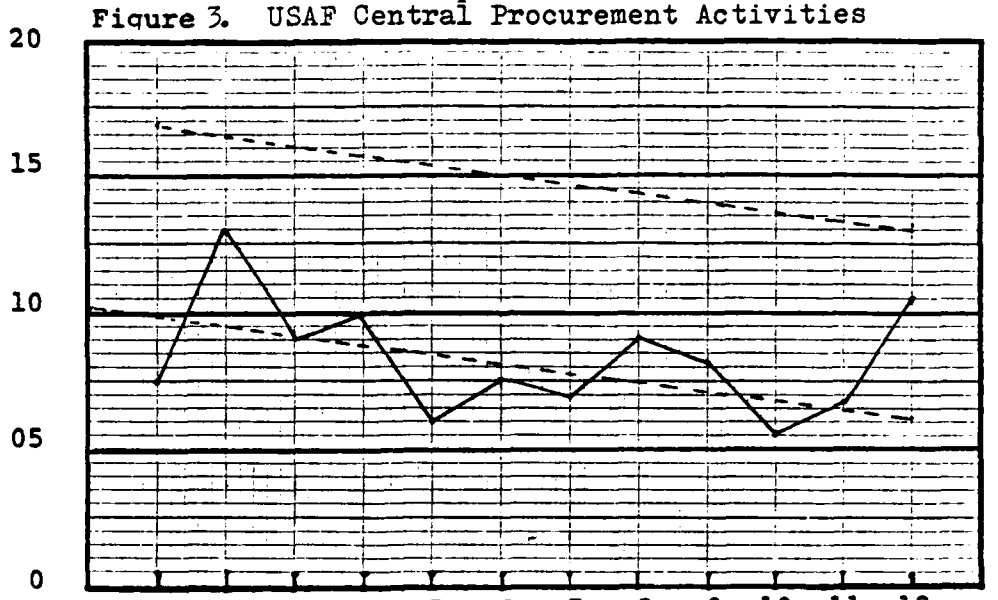
Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	10.5	11.8	9.2	8.8	6.3	7.7	6.9	7.8	7.1	6.1	6.1	11.7

A 10.89 % B -.48 % sYd 2.39 % Limit 9.92 %

PERCENT OF AWARDS BY FISCAL MONTH

Composite of FY1977-1980

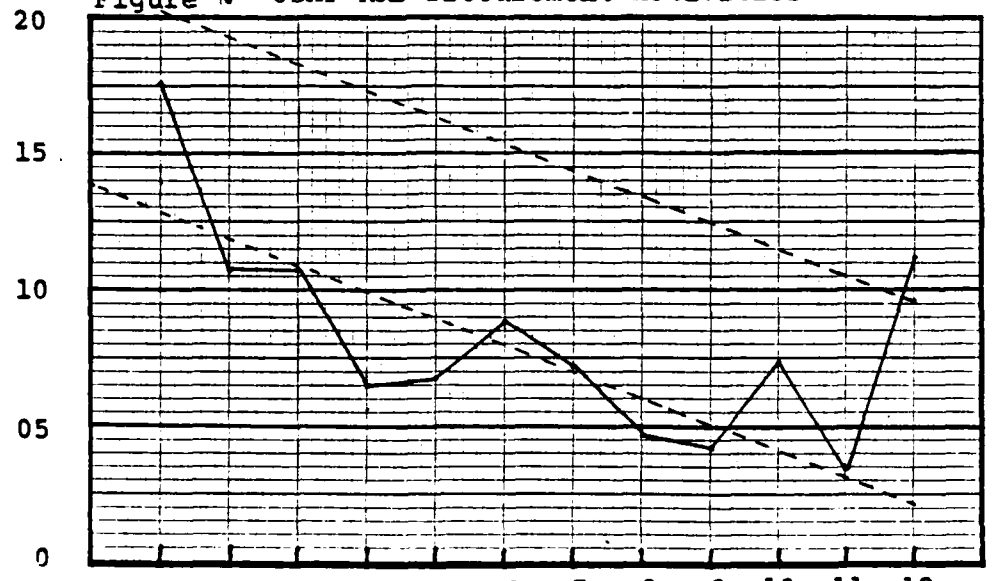
Figure 3. USAF Central Procurement Activities



A 10.20 % B -.34 % sYd 3.54 % Limit 13.21 %

Composite of FY1977-1980

Figure 4. USAF R&D Procurement Activities

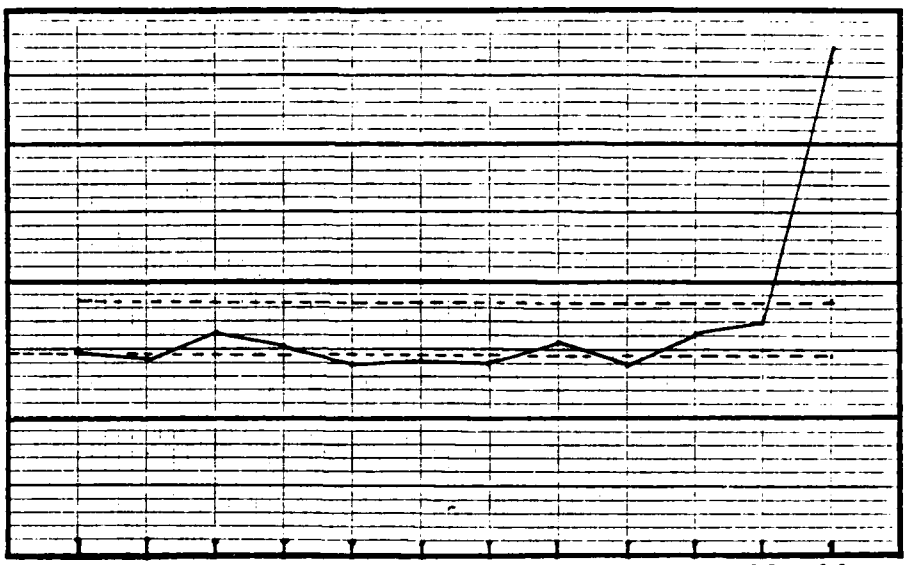


A 13.90 % B -.97 % sYd 3.64 % Limit 9.54 %

PERCENT OF AWARDS BY FISCAL MONTH

Composite of FY1977-1980

Figure 5. USAF Base Procurement Activities

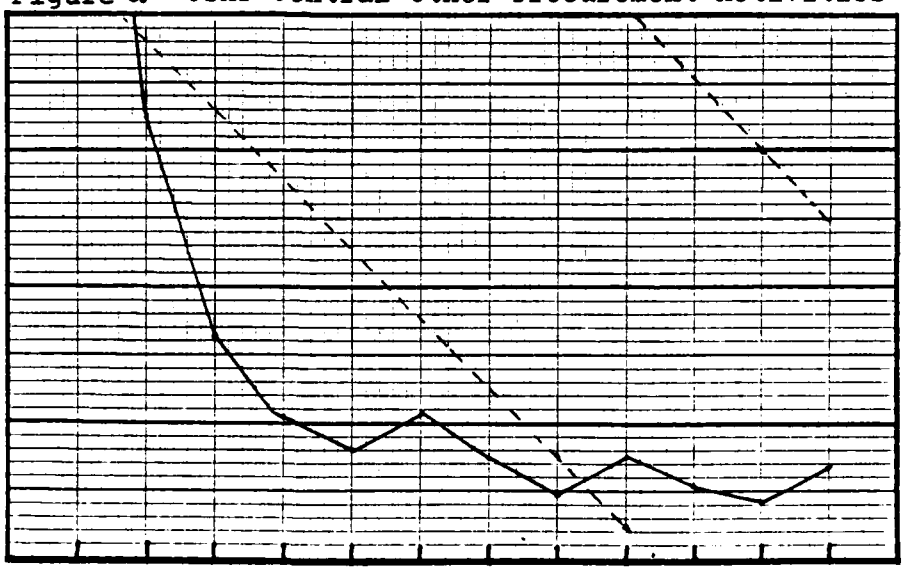


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	7.5	7.2	8.1	7.6	7.0	7.1	7.0	7.7	6.9	7.6	8.0	18.5

A 7.38 % B .006 % sYd .99 % Limit 9.38 %

Composite of FY1977-1980

Figure 6. USAF Central Other Procurement Activities



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	42.6	16.3	8.1	5.3	4.0	5.4	3.8	2.4	3.8	2.7	2.1	3.4

A 23.82 % B -2.51 % sYd 9.39 % Limit 12.49 %

USAF CONTRACT AWARDS FY 1977-1980
SEPTEMBER PERCENTAGE BY CLAIMANT CODE

Claimant Code (Commodity Class)	Count	Fiscal Year 1977	1978	1979	1980
Percentage of Total USAF Awards in September		10.4	9.1	14.6	12.1
1. Airframes, related assemblies and spares	2	3.9	5.6	21.9*	22.3*
2. Aircraft engines and related parts		4.9	4.4	4.6	1.1
3. Other aircraft equipment and supplies	2	13.5*	13.4*	9.9	5.9
4. Missiles and space equipment	3	8.1	13.4*	18.4*	12.2*
5. Ships	4	14.0*	90.4*	23.3*	14.9*
6. Combat vehicles		Ø.Ø	Ø.Ø	Ø.Ø	Ø.Ø
7. Non-combat vehicles	1	26.0*	4.5	7.3	4.5
8. Weapons		4.7	3.7	12.5	8.3
9. Ammunition		5.5	4.6	2.3	1.6
10. Electronics and communication equipment	3	16.7*	13.2*	14.8*	10.7
11. Petroleum		.8	Ø.Ø	9.0	1.5
12. Other fuels and lubricants	2	14.9*	3.9	70.6*	4.8
13. Separate containers and handling equipment	2	100.0*	30.0*	0.0	81.1
14. Textiles, clothing and equipage	1	13.4*	5.9	5.0	5.4
15. Building supplies	3	39.0*	39.6*	10.0	28.9*
16. Subsistence	2	9.7	12.6*	12.9	13.1*
17. Transportation equipment (Railway)	1	Ø.Ø	Ø.Ø	93.0*	Ø.Ø
18. Production equipment	3	5.1	47.5*	15.1*	20.8*
19. Construction	4	39.5*	37.8*	45.7*	49.2*
20. Construction equipment	2	12.6*	Ø.Ø	18.7*	6.7
21. Medical and Dental Supplies	3	27.0*	Ø.5	17.7*	23.7*
22. Photographic equipment	2	8.9	13.2*	10.5	17.1*
23. Materials handling equipment	4	21.9*	22.0*	20.0*	52.3*
24. All other	3	19.8*	14.9*	11.0	16.1*
25. Services		6.9	5.5	5.8	8.5
26. Utilities	1	10.8*	8.4	11.8	8.3
27. Actions less than $10,000	4	13.9*	12.0*	15.3*	14.3*

*Claimant code percentage exceeds total USAF percentage.
Count: Number of years claimant code percentage exceeded total USAF percentage.
Note: Percentage values computed on basis of 1972 constant dollars awarded in subject year.

Exhibit H

CROSSTABULATION OF TYPE OF ITEM BOUGHT BY FISCAL YEAR MONTH

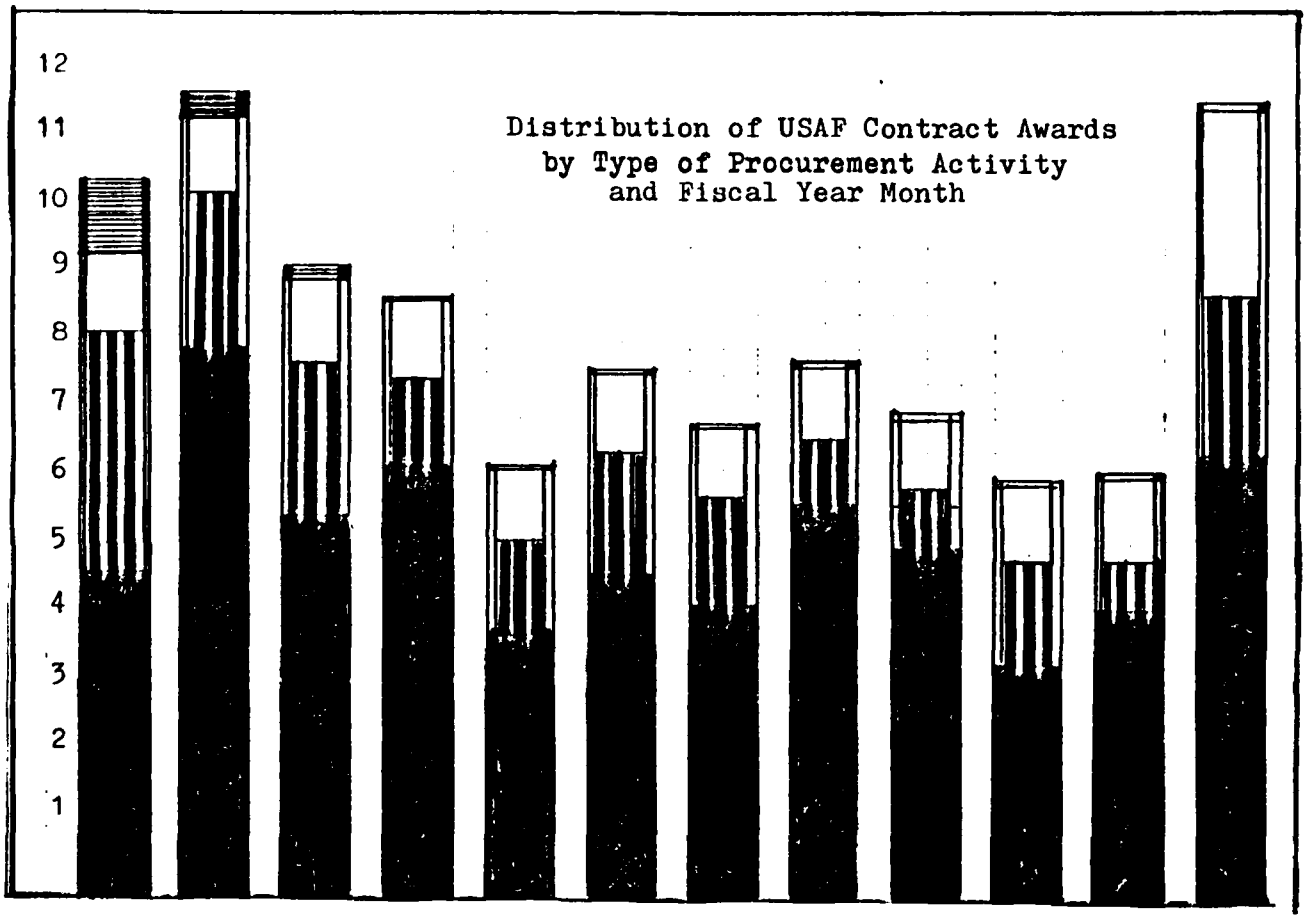
USAF CONTRACT AWARDS DURING FISCAL YEARS 1977-1980

FYMONTH	COUNT / ROW PCT / COL PCT	TYPE 101.1 AIRCRAFT	102.1 ENGINES	103.1 AIRCRAFT EQUIP	104.1 MISSILE	105 SHIPS	106.1 TANKS	107.1 CARS	108.1 GUNS	109.1 AMMO	110 ELTRONIC	111.1 POL	112.1 LUBES	113.1 PACKING EQUIP	114.1 CLOTHING	115 BUILDING EQUIP	116.1 FOOD	117.1 RAILROAD EQUIP	118.1 PRODUCT EQUIP	119.1 CONSTR	120.1 CONSTR EQUIP	121.1 MEDICAL	122.1 PHOTO	123.1 HANDLING EQUIP	124.1 OTHER	125 SERVICES	126.1 UTILTIES	UNDER 0:0000 127.1	ROW TOTAL
OCT	1.	798	335	175	814	0	0	5	77	29	522	7	0	0	3	0	15	0	2	41	0	1	8	1	36	1207	22	147	4244
		18.8	7.9	4.1	19.2	.0	0	.1	1.8	.7	12.3	.2	.0	0	.1	.0	.3	0	.0	1.0	.0	.0	.2	.0	.9	28.4	.5	3.5	10.5
		10.1	6.5	6.2	13.3	.3	0	3.4	17.9	6.1	6.7	14.4	5.2	0	4.6	1.4	5.0	0	5.8	4.4	3.9	6.7	7.3	1.4	5.6	36.5	4.8	3.9	
MAY	2.	1093	1041	195	594	0	0	4	43	56	939	1	0	0	5	0	22	0	1	36	1	1	20	1	42	478	31	263	4778
		21.8	21.8	4.1	12.4	.0	0	.1	.9	1.2	19.6	.0	.0	.0	.1	.0	.5	0	.0	.8	.0	.0	.4	.0	.9	10.0	.7	5.5	11.8
		12.7	20.2	6.7	9.7	.6	0	3.1	10.1	11.8	12.1	2.4	6.6	31.6	8.8	6.6	7.4	0	3.9	4.8	4.6	7.3	17.4	1.3	6.4	14.5	6.7	7.8	
DEC	3.	764	450	221	578	0	0	9	39	45	987	2	0	0	7	0	26	0	1	46	1	1	17	1	56	227	42	293	3746
		20.9	12.0	5.9	15.2	.0	0	.2	1.0	1.2	26.2	.1	.0	.0	.2	.0	.7	0	.0	1.2	.0	.0	.5	.0	1.5	6.1	1.1	7.8	9.2
		9.9	8.7	7.8	9.3	1.3	0	7.0	9.1	9.5	11.7	5.2	12.2	.9	10.6	3.8	8.6	0	4.5	5.0	12.9	9.1	14.8	2.2	8.7	6.9	9.0	7.7	
JAN	4.	401	1160	190	389	0	0	18	35	71	633	1	1	0	5	0	26	0	0	40	1	0	6	0	55	175	43	317	3576
		11.2	32.7	5.3	10.9	.0	0	.5	1.0	2.0	17.7	.0	.0	0	.1	.0	.7	0	.0	1.1	.0	.0	.2	.0	1.5	4.9	1.2	8.9	8.8
		5.1	22.7	6.7	6.3	.5	0	13.7	8.2	14.8	8.2	1.8	24.8	0	7.1	3.5	8.7	0	1.6	4.3	9.8	2.8	5.5	.5	8.5	5.3	9.3	8.4	
FEB	5.	525	166	170	368	0	0	21	35	45	556	11	0	0	2	1	21	0	1	25	1	1	6	3	42	191	43	311	2549
		21.8	6.5	6.7	14.1	.0	.0	.8	1.4	1.8	21.8	.4	.0	.0	.1	.0	.8	0	.0	1.0	.0	.0	.2	.1	1.6	7.5	1.7	12.2	6.3
		6.8	3.2	6.0	5.9	2.4	100.0	15.8	8.1	9.5	7.2	24.2	11.0	3.8	3.5	8.2	7.1	0	2.1	2.7	0.9	5.4	5.5	7.6	6.5	5.8	9.2	8.2	
MAR	6.	513	437	220	627	0	0	11	37	133	589	1	0	0	7	0	28	0	2	33	1	1	7	2	56	178	49	387	3159
		16.2	13.8	7.0	19.8	.0	0	.3	1.2	4.2	18.6	.0	.0	.0	.2	.0	.9	.0	.1	1.1	.0	.0	.2	.1	1.8	5.6	1.5	9.7	7.8
		6.5	8.5	7.7	10.2	2.2	0	8.8	8.7	27.8	6.6	1.9	6.8	1.4	11.0	4.7	9.5	4.7	8.4	3.6	5.8	11.8	6.4	5.3	8.7	5.4	10.5	8.1	
APR	7.	749	167	224	515	0	0	6	21	15	485	1	0	0	7	1	21	0	4	37	2	1	6	2	58	185	35	328	2787
		26.9	6.0	8.1	18.5	.0	0	.2	.7	.5	16.0	.0	0	.0	.2	.0	.8	0	.1	1.3	.1	.0	.2	.2	1.8	5.2	1.1	11.8	6.9
		9.5	3.2	7.9	8.4	4.1	0	4.6	4.8	3.2	5.7	2.5	0	3.9	10.0	21.1	7.2	0	13.9	4.0	13.6	7.7	5.2	15.0	7.6	6.4	7.4	8.7	
MAY	8.	644	299	574	387	0	0	23	23	18	571	10	0	0	5	1	29	0	2	66	0	1	7	3	56	116	40	331	3284
		20.1	9.3	17.9	12.1	.0	0	.7	.7	.6	17.8	.3	.0	.0	.2	.0	.9	.0	.1	2.1	.0	.0	.2	.1	1.7	3.6	1.2	10.3	7.9
		8.1	5.8	20.2	6.3	1.7	0	17.8	5.3	3.9	7.3	21.7	3.4	22.1	7.6	8.5	9.7	19.8	8.6	7.2	3.4	9.5	6.5	5.5	8.4	3.5	8.5	8.8	
JUN	9.	1095	198	197	388	0	0	7	47	10	491	1	0	0	8	0	23	0	3	46	2	1	7	1	47	128	33	322	2686
		24.8	6.6	6.8	10.7	.0	0	.2	1.6	.6	17.0	.0	0	0	.3	.0	.8	0	.1	1.6	.1	.0	.3	.0	1.6	4.4	1.1	11.2	7.1
		12.7	3.7	6.9	5.8	2.6	0	5.4	10.9	3.9	6.3	1.4	0	0	12.6	3.9	7.8	0	11.9	5.8	14.7	5.9	6.5	2.2	7.3	3.9	7.8	8.5	
JUL	10.	257	256	237	443	0	0	5	24	15	595	1	0	0	6	0	26	0	3	65	1	1	9	3	58	129	43	313	2472
		10.4	9.6	9.6	17.9	.0	0	.2	1.0	.6	24.1	.0	.0	0	.2	.0	1.1	.0	.1	2.6	.0	.0	.4	.1	2.4	5.2	1.7	12.7	6.1
		3.3	4.6	8.3	7.2	2.9	0	3.8	5.5	3.2	7.7	1.1	14.6	0	9.1	5.8	8.9	5.3	10.5	7.1	6.1	10.4	8.2	7.8	9.8	3.9	9.1	8.3	
AUG	11.	250	472	165	329	0	0	13	18	16	544	10	0	0	6	0	23	0	2	87	0	1	5	10	52	187	39	322	2469
		10.1	19.1	6.7	13.3	.0	0	.5	.7	.6	22.0	.4	.0	.0	.2	.0	.9	0	.1	3.5	.0	.0	.2	.4	2.1	4.3	1.6	13.1	6.1
		3.2	9.2	5.8	5.4	4.4	0	9.5	4.1	3.8	7.8	20.4	.4	4.8	9.8	7.9	7.8	0	6.2	9.5	3.8	5.2	4.6	21.2	8.8	5.2	6.3	8.5	
SEP	12.	968	193	274	791	5	0	11	31	17	1058	1	0	0	4	2	26	0	6	397	2	2	14	14	100	222	48	523	4721
		20.5	4.1	5.8	16.8	.1	0	.2	.7	.4	22.4	.0	.0	.0	.1	.0	.6	.0	.1	8.4	.0	.0	.3	.3	2.1	4.7	1.0	11.1	11.6
		12.2	3.7	9.6	12.9	76.9	0	8.6	7.2	3.5	13.6	2.9	16.6	31.5	6.8	25.3	12.3	70.9	22.6	43.2	14.0	18.4	12.2	31.8	15.4	6.7	10.2	13.8	
COLUMN TOTAL		7906	5150	2843	6125	7	0	133	430	478	7767	47	3	1	65	6	295	0	29	919	11	12	115	46	647	3303	467	3778	48591
		19.5	12.7	7.0	15.1	.0	.0	.3	1.1	1.2	19.1	.1	.0	.0	.2	.0	.7	.0	.1	2.3	.0	.0	.3	.1	1.6	8.1	1.2	9.3	100.0

Note: All "count" values are 1972 constant dollars

Exhibit I

Exhibit J

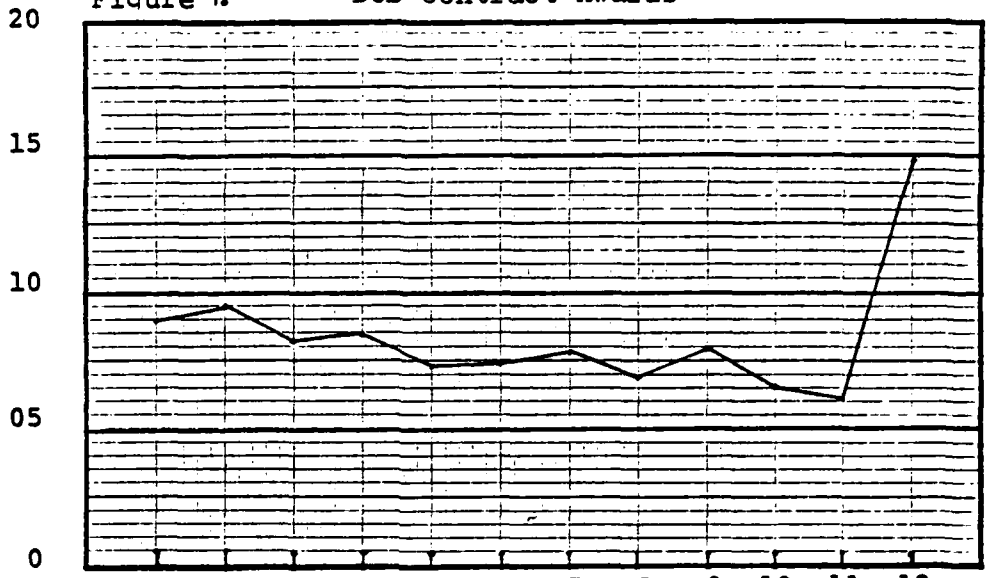


MONTHS	1	2	3	4	5	6	7	8	9	10	11	12	Total
PERCENTS	10.5	10.8	9.2	8.8	6.3	7.7	6.9	7.8	7.1	6.1	6.1	11.7	
Central Other	1.1	.4	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1	2.6
Base	1.1	1.0	1.2	1.1	1.0	1.0	1.0	1.1	1.0	1.1	1.2	2.7	14.6
R&D	3.6	2.2	2.2	1.3	1.4	1.8	1.5	1.0	.9	1.5	.7	2.3	20.4
Central	4.7	8.1	5.5	6.3	3.8	4.7	4.3	5.7	5.1	3.4	4.2	6.5	62.3
Totals	10.5	10.8	9.2	8.8	6.3	7.7	6.9	7.8	7.1	6.1	6.1	11.7	99.9

Note: All values shown are percentages of the total USAF contract awards during fiscal years 1977 through 1980

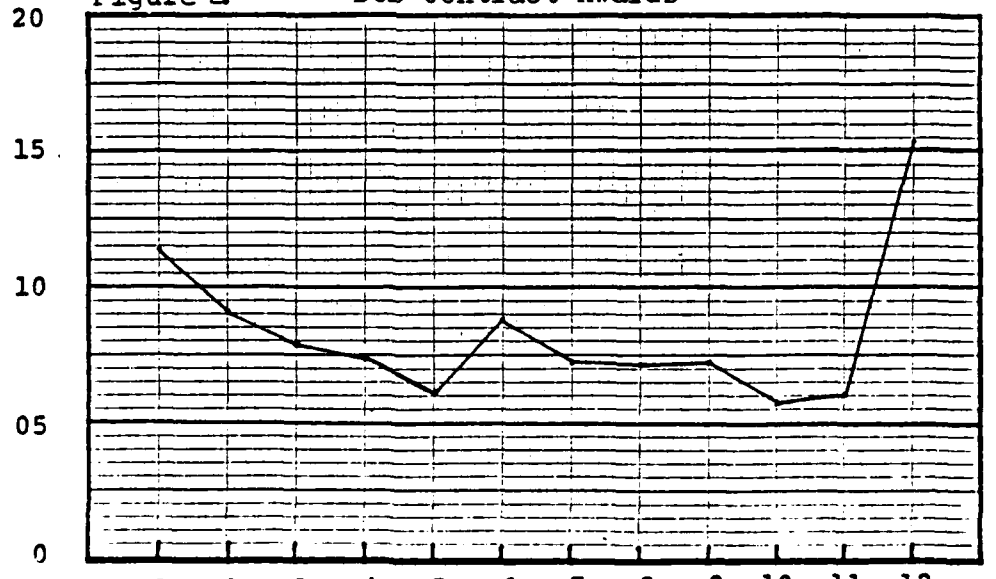
PERCENT OF AWARDS BY FISCAL MONTH

Figure 1. Composite of FY1972-1976 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	9.0	9.5	8.2	8.4	7.3	7.4	7.8	6.9	8.0	6.5	6.1	14.9

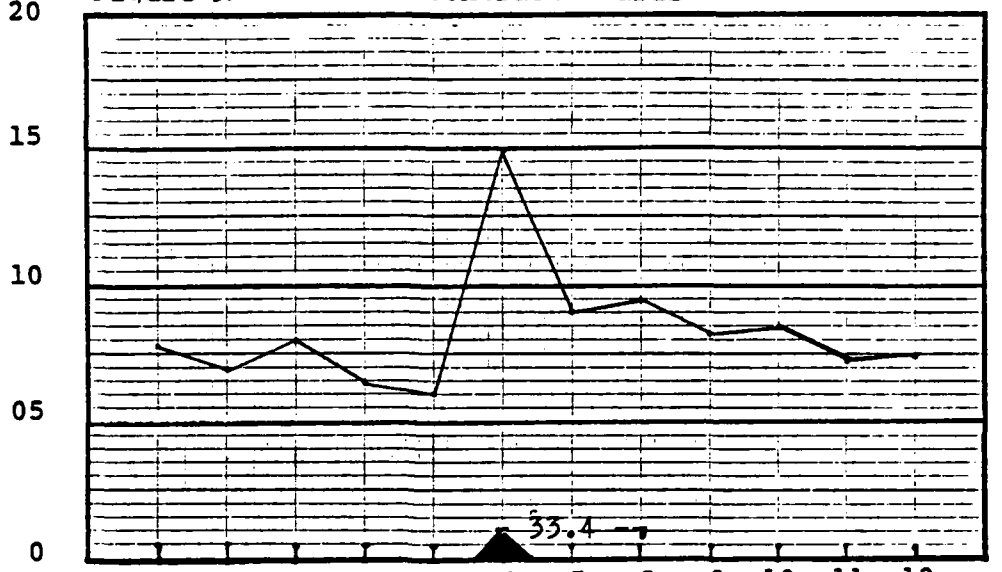
Figure 2. Composite of FY1977-1980 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	11.4	9.1	7.9	7.4	6.1	8.9	7.3	7.2	7.3	5.8	6.1	15.4

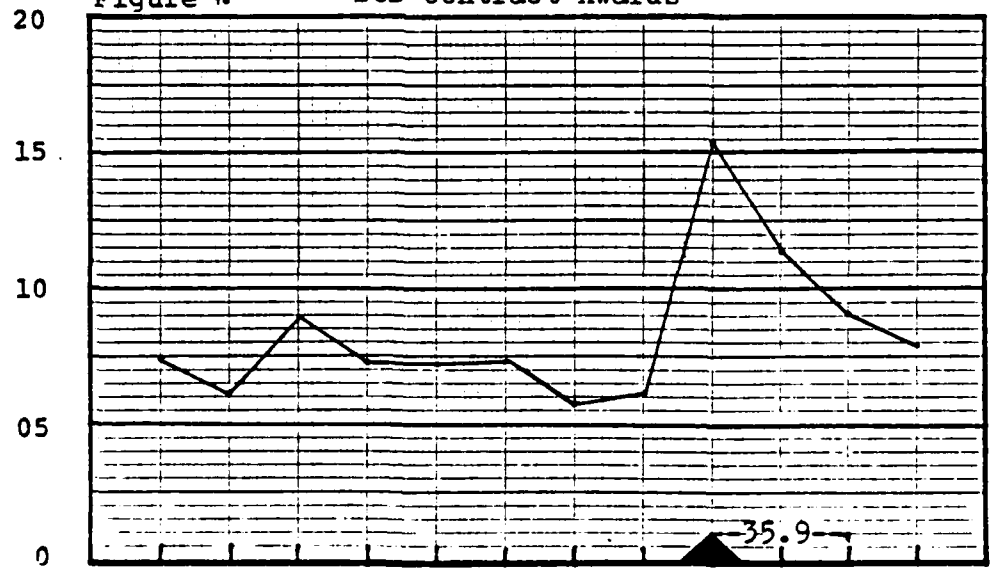
PERCENT OF AWARDS BY CALENDER MONTH

Figure 3. Composite of FY1972-1976 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	7.8	6.9	8.0	6.5	6.1	14.9	9.0	9.5	8.2	8.4	7.3	7.4

Figure 4. Composite of FY1977-1980 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	7.4	6.1	8.9	7.3	7.2	7.3	5.8	6.1	15.4	11.4	9.1	7.9

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Introduction

This chapter presents the answers to the research questions and the conclusions that were drawn from those answers. Following the conclusions and a discussion of the impact of those conclusions on policy actions, the authors make a number of recommendations for future research of year-end spending in the DOD.

Answers to Research Questions

Research Question One

What is the magnitude of the year-end spending surge in the DOD?

This question was answered in terms of the dollar value of DOD contract awards to U.S. business. During fiscal years 1977 to 1980, the dollar value of DOD contract awards to U.S. business surged in September. The average magnitude of the surge was 6.95 percent[1] of the total dollar value of contracts awarded during the four fiscal years.

[1]The magnitude of the surge was determined by calculating the dollar value by which actual September awards exceeded a maximum expected value derived from the pattern of contract awards of the prior 11 months (See Chapter IV).

Research Question Two

Does an identifiable type of DOD procurement activity exhibit a year-end spending surge?

The researchers were able to answer this question only for procurement activities within the Air Force. During the time period studied, the aggregate Air Force year-end surge in contract awards to U.S. business averaged 2.01 percent. Base procurement and research and development procurement activities experienced an average surge of 9.36 percent and 1.76 percent, respectively. The two other general categories of Air Force procurement activities, Central (Air Force Systems Command and Air Force Logistics Command) and Central (specialized offices of other Air Force major commands), did not exhibit a year-end surge.

Research Question Three

Are particular goods and services purchased in higher proportions at year-end?

This question was answered for the Air Force only. Of the 27 general types of commodities purchased by the Air Force, the research methodology identified 11 commodities which were consistently purchased in relatively higher proportions in the month of September.

Conclusions

Based on the answers to the research questions and the findings, the authors have concluded the following:

Department of Defense

1. The DOD experienced a year-end spending surge for the period FY '77 to FY '80. This conclusion is based on the finding that, in each of the four years, a surge occurred in the September total of dollars awarded to U.S. business.[2]

2. It is possible to identify year-end surge by DOD component, and by types of procurement activities within a component. It is also possible to identify the types of commodities which are involved in the year-end surge.

3. A year-end spending surge is characteristic of specific types of procurement activities.

4. The procurement activities of a DOD component have award patterns which are unique to the type of procurement activity. This conclusion was drawn from the observation of the annual and composite award pattern of the four general categories of Air Force procurement activities.

Air Force

1. The Air Force experienced a year-end surge during the period FY '77 to FY '80. This conclusion is based on the finding that, in three of the four years studied, a surge occurred in the September total of dollars awarded to U.S. business.[3]

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[2]For the DOD, awards to U.S. business accounted for approximately 80 percent of the annual total of award dollars (See Chapter III).

[3]For the Air Force, awards to U.S. business accounted for approximately 76 percent of the annual total of award dollars (See Chapter III).

2. A year-end surge is characteristic of Air Force base procurement, and research and development procurement activities.

3. The surge experienced by base procurement is the major factor influencing the magnitude of the surge exhibited by the Air Force. Base procurement experienced the highest surge for all years tested. While base procurement accounted for 14.6 percent of the annual total Air Force dollars awarded to U.S. business, in September, base procurement accounted for 23.2 percent of total Air Force awards.

Implications of Conclusions

Department of Defense

Future policy actions with regard to year-end surge should recognize the existence, rather than the potential existence, of year-end spending surge within the DOD. While this study did not determine the exact magnitude of the DOD year-end surge, the authors are confident that the study has conclusively shown that a year-end spending surge does exist within the DOD.

It should also be recognized that year-end spending surge is prevalent within specific types of procurement activities. This research is deemed to have shown that the different types of procurement activities exhibit significantly different contract award patterns. The award patterns suggest that the factors which influence procurement operate

differently for given procurement activities. Therefore, a generalized approach to detering year-end spending surge would quite probably result in ineffective policies because such an approach would fail to address the specific causes of the surge within the types of procurement activities that experience a surge.

Air Force

Air Force personnel charged with developing controls for year-end spending surge should note the prominent influence of the base procurement activities in determining the magnitude of the Air Force year-end surge. The magnitude of surge is distinguished from the absolute amount of contract awards. The first is a measure of the change in the level of contract dollar awards, while the second is the level of the contract dollar awards. It would be easy to perceive that the base procurement activities do not significantly influence the Air Force contract award patterns because this type of activity awards less than 15 percent of the total award dollars. However, in regard to year-end spending surge, the perception would be misleading. The base procurement activities experience a surge which is more than twice the magnitude of that experienced by any other type of activity. It also should be noted that the base procurement activities were found to be a major purchaser of six of the eleven commodities identified as being purchased in higher proportions at year-end.

Recommendations for Future Research

A variety of possibilities exists for future research of DOD year-end spending. On the basis of observations made during this study, the authors recommend that future research examine empirical evidence related to the following areas.

Other Award Categories

The patterns of DOD awards to other government agencies, educational and non-profit institutions and foreign business should be examined and tested for year-end surge. These award categories, which were excluded from this research, may be experiencing a surge which should be addressed in developing measures for controlling DOD year-end surge. Such a study would also provide information which could enable a more exact determination of the magnitude of the DOD surge.

Air Force Central Procurement (AFSC and AFLC)

An in-depth analysis should be made of Air Force Central (AFSC and AFLC) Procurement. Since this category of activity, which did not exhibit a year-end surge, accounts for approximately 60 percent of the Air Force total of award dollars, a more detailed study of these activities seems warranted. The central procurement functions of the Air Force Systems Command and the Air Force Logistics Command,

which actually represent two distinct types of procurement activities, were combined by the data source used for this research. Further studies and tests of the award patterns of each of these central procurement activities would provide a more complete description of Air Force procurement practices.

Causes of Surge in Procurement Activities

A study should be made of the factors which cause the types of procurement activities to experience different levels of year-end surge. Two of the factors which should be analyzed are: first, the relationships between an activity's surge and the type of appropriation which finances the activity's procurements, and second, the impact of supplemental appropriations on the year-end surge.

Appropriations. The authors observed that the occurrence of year-end spending surge within the Air Force procurement activities appeared to be related to the management flexibility which was innately permitted within the funds appropriated to finance the contracts awarded by the procuring activities. The central procurement activities, which did not experience a year-end surge, awarded contracts which were primarily financed by funds appropriated for management during a three year period. In contrast, the base procurement activities, which experienced a large surge, primarily awarded contracts financed by the more constrained,

single year, O&M funds. Therefore, it would appear that the management flexibility allowed within the funds may be a significant factor in determining whether an activity experiences a year-end surge. However, these are preliminary observations, rather than conclusive evidence.

Supplementals. The DOD has indicated that supplemental appropriations do influence year-end surge (See Chapter II). A review of supplemental appropriations received by the Air Force during fiscal years 1977 to 1980 indicated that relatively significant amounts of additional O&M and R&D funds were made available later in the fiscal year (See Exhibit L). These supplementals are alleged to provide much of the financing for procurements which were deferred, and later processed by the base and R&D procurement activities. The amount of the O&M and R&D supplementals may be a partial explanation of the relatively greater surge of the base and R&D procurement activities.

It may be reasonably inferred that Congress recognized the relationship between the supplementals and the year-end spending when it excluded the supplementals from the year-end "cap" which was placed upon the DOD O&M appropriations. Until the impact of the supplementals upon the year-end surge is determined, it will be impossible to determine if the cap was effective. However, the large year-end surge in the base procurement activities would indicate that the cap has not been effective, unless a large amount of the

base surge can be attributed to supplemental funds. Research is needed in this area so that a distinction may be made between the year-end surge which may be attributable to supplemental funds and that which may not.

Factors Influencing Commodity Procurements

A study should be undertaken to determine the factors which cause particular classes of commodities to be purchased in higher proportions at year-end. The DOD testimony before the Senate Subcommittee on Oversight of Government Management indicated that the need to hold some funds in reserve for emergencies, and the uncertainties regarding amount of funds to be appropriated in supplemental appropriations caused some procurements to be deferred. More detailed information as to why the procurements of specific commodities are deferred until year-end could be used either to more evenly distribute such procurements throughout the year, or to justify the timing of such procurements when questioned by external investigators.

USAF SUPPLEMENTAL APPROPRIATIONS AND CONTRACT AWARD DOLLARS: FISCAL YEARS 1977-1980

O&M Funds/Base Awards

Fiscal year	1977	1978	1979	1980
Total Contract Awards	1900	2216	2441	2877
Supplemental	172	246	122	1752
Supplemental as a Percent of total awards	9.09	11.12	5.00	60.90

R&D Funds/R&D Awards

Fiscal year	1977	1978	1979	1980
Total Contract Awards	3093	3067	3120	3669
Supplemental	-	241	190	6.4
Supplemental as a Percent of total awards	-	7.84	6.09	.2

Procurement Funds/Central Awards

Fiscal year	1977	1978	1979	1980
Total Contract Awards	8759	9723	9688	11616
Supplemental	-	204	-	107
Supplemental as a Percent of total awards	-	2.09	-	.92

Note: All values are in millions of current dollars.

Exhibit L

APPENDIX A

A PILOT STUDY OF DEPARTMENT OF DEFENSE CONTRACTS AWARDED DURING FISCAL YEARS 1952 TO 1976

Purpose

This appendix describes a pilot study of data related to DOD contracts awarded during fiscal years (FY) 1952 to 1976. It was intended to serve several purposes. First, it was a means of identifying major characteristics in the data which would be encountered in the main research effort. Second, the study allowed the researchers to examine various empirical testing procedures for possible incorporation into the research methodology, and third, to identify and eliminate procedural flaws in the methodology.

This study was not originally intended to be a part of the thesis, but it became apparent that the completed study contained information which could aid the understanding of the year-end spending surge within the DOD. To properly separate this study from the more rigorous methodology of the thesis, the study has been included as an appendix. Although further work may be necessary before readers can draw final conclusions, the authors consider their findings significant and have included this appendix for the following reasons:

1. The study showed that the percentage of DOD contract dollars awarded at year-end decreased substantially from 1952 to the mid 1960's. This information is potentially

useful in determining which policies or procedural changes were effective in regulating the DOD year-end spending levels.

2. The study also showed that the patterns of DOD contract awards in the earlier months of the year had shifted in a manner suggestive of fundamental changes in the DOD operating practices. An understanding of the changes in the patterns is essential for subsequent understanding of the impact of the practices upon the timing of contract awards.

This appendix identifies the data and methods used in performing the pilot study. It also includes discussions of statistical concepts, and the findings and conclusions of the pilot study. Information which may assist future research is provided in a final section.

Data Source

The data used were published by the DOD, Washington Headquarters Service (WHS) in Table B, awards to U.S. Business Firms, of Prime Contract Awards (13:78-80). The WHS publishes semiannual reports on the DOD procurement actions. Fiscal year 1952, starting July 1951, was the earliest year for which data were published. The data were abstracted in millions of dollars (Exhibit N) and similarly in monthly percentages of the yearly dollar totals (Exhibit O).

Use of the SPSS

The Statistical Package for Social Sciences (SPSS), a software package containing numerous statistical test procedures and print formats, was used to aid data analysis. The study used the condescriptive, crosstabs, frequencies, and scattergram features of the SPSS, together with their statistical printout options (35). These SPSS features performed calculations, provided plots of data points, and transformed data as required for analytical procedures and tests.

The data were input to a memory device accessible to the SPSS, then a series of tests were run on the data base. At various points the test programs were altered to correct errors, or to pursue aspects of interest. Ultimately a program containing the desired tests and printouts was developed, and is shown in Appendix D. This program was successively applied to the data base to sort, analyze, and printout reports in five year segments, i.e., 1952-1956, 1957-1961, et seq. The five year period was selected as a means of reducing the data of the 25 individual years into five data subsets indicating the average characteristics of the awards during each of the five year periods. Reducing the data into subsets made the data more comprehensible and made changes in the award patterns more distinguishable. Five years was selected because it enabled the segregation

of the data into subsets of equal size. A run was also made to produce statistics and composite graphic products covering the 25 year period.

Analysis Concepts and Perspectives

The pilot study examined methods of analyzing and describing the general characteristics of the data, emphasizing awards made at the year-end. Efforts were made to determine the typical monthly dollar award values, the amount of variability in the data, and the characteristics of the award patterns, including any trends or pecularities in the data. Typical is used within this appendix to denote that award value which would represent the ordinarily expected value.

Frequently the average value, or mean, is used as the representation of the typical (38:170). The mean alone, however, has limited descriptive power. In most cases, the descriptive power of the mean is enhanced by a measure of the dispersion of the data with respect to the mean. The three measures of dispersion considered in this study were range, standard deviation and coefficient of variation.

The simplest measure of dispersion is the range, which indicates the difference between the lowest and highest values observed in the data (34:58). Another widely used measure of dispersion is the standard deviation (38:177). The standard deviation is computed by use of the following formula:

$$\sigma = \sqrt{\frac{\Sigma (X-U)^2}{N}}$$

where σ : standard deviation

Σ : the sum

U : mean value

N : number of observations

X : each observation.

The extent to which values change is called variability. The coefficient of variation is a common method of comparing the variability of data among data sets of differing dimensions (38:186). The coefficient expresses the amount of variation as a percent of the mean value. The formula of variation (V) is:

$$V = \frac{\sigma}{N} \times 100$$

Use of Percentage Terms

The focus of this study was on the relative distribution of the contract award dollars within the months of the fiscal years, rather than on the absolute dollar value of the awards. During the course of the study it was found that the use of percentage values simplified the calculation of the statistics and the interpretation of the test results. The calculations were simplified because a simple arithmetic mean could be computed to determine the "average percentage" of contract awards of two distributions of unequal dimensions. Alternatively, if absolute dollar

values had been used, then the determination of the "average dollar value of the contract awards" within two distributions of unequal dimension would have required the computation of a more complex weighted arithmetic average (38:134). Interpretation of test results were simplified because a percentage, e.g., 10 percent, of a distribution may be readily compared with another percentage, e.g., 20 percent, of another distribution. These percentage comparisons remain valid and understandable even in situations where the absolute dimensions of the items distributed may not be easily compared, i.e., when the real value of money might have an influence upon the purchasing power of the dollar value of contracts awarded in distant points in time. In all cases, the percentage values were calculated by dividing monthly award dollars by the total award dollars for the respective fiscal years. The term "the value of the awards in..." was used to mean the percentage value of award dollars for a given month or group of months.

Findings

The findings of the pilot study were derived from evaluating a series of test results, rather than from any single tests. In some instances it was difficult to determine whether the initial test results were aberrations or valid representations of award practices until further tests were made. The findings presented are considered to be

reasonably conclusive. Significance tests were not conducted because census data were used. The primary support for the findings is contained in the statistics, charts, and graphical displays of the attached exhibits. The exhibits will be described when they are introduced into the discussion of the findings which follow.

Finding Number One

The percentage value of contract awards in the last month of a year was always higher than the mean value of the contract awards for the first eleven months of the fiscal year. This finding is supported by Tables 2 and 3 of Exhibit O, the graphs of Exhibit P, and the scattergram of Exhibit Q.

Exhibit O was developed by sorting the data into subsets. Each subset contained the data of five successive years, i.e., fiscal years '52-'56; '57-'61; '62-'66; '67-'71; '72-'76. The values of the subsets were used to calculate the indicated statistics of selected portions of the object years. Selected year portions included specific single months within the five year periods, e.g., the twelfth month of the years; or a group of months within the five year period, e.g., the first eleven months in each of the five years. For example, Table 3 was developed by summing the percentage values of contract dollars awarded in the last month of fiscal years '52, '53, '54, '55, '56 and dividing the sum by 5 to determine the first value indicated in the mean column. Table 2 was developed by summing the values

of the first eleven months of the first five years, and dividing the sum by 55. This procedure was repeated for each of the five data subsets. The tables also include statistics for selected portions of the years in which the values for all 25 years were included in the calculations. These aggregate values are indicated in rows labeled FY '52-'76. Table 2 shows that during FY '52-'76 the values of the first eleven months averaged 7.50. Table 3 shows that the last month values averaged 17.51 during the 25 year period.

The graphs of Exhibit P are five year composite graphs of the monthly pattern of awards. These graphs were developed using a procedure similar to that used with the Exhibit O Tables, i.e., the sum of the first month values for FY '52, '53, '54, '55, '56 was divided by 5, and the calculation value was used as a plot point. The procedure was repeated for the values of the succeeding months. The graphs clearly show an extremely large increase in the values at year-end.

A further illustration of the difference in the values of the last months and those of the earlier months is Exhibit Q. Exhibit Q is a scattergram which provided a plot of the award values by month for the entire 25 year period. Frames have been added to the scattergram to distinguish the months, and to bracket the low and high values of each month group. The scattergram shows that the values of the last month of the year were generally above even the highest values of the other months.

Finding Number Two

The value of the contract awards in the last month of the fiscal years decreased substantially and persistently from 1952 to the early 1970's. But, as shown in Figure 2 of Exhibit R, the trend seems to have reversed after fiscal year 1971. Figure 2 of Exhibit R was developed by connecting points on a scattergram of the twelfth month values for the 25 year period. Table 3 of the previously described Exhibit O shows a progression of the last month mean values.

Finding Number Three

The mean value of the awards in the first eleven months increased as those of the last month (the twelfth month) of the fiscal years decreased. This redistribution must necessarily occur because the first eleven months are complimentary to the twelfth month in relation to the fiscal year. Moreover, as the mean value of the awards in the first eleven months increased, the general amount of variation among the first eleven month values decreased. The decrease in the variation indicates a more even distribution of the values within the first eleven months. These changes in the award values are shown in Figure 1 of Exhibit R. The exhibit is a scattergram of the award values displayed in the sequence of the fiscal years. The values were framed to aid analysis. The lower boundaries of the frame show that the low end of the value range attenuated upward from fiscal year 1952 to fiscal year 1962, and then remained fairly

stable thereafter. The upper boundaries of the frame show that the high end of the value range attenuated downward from fiscal year 1952 to fiscal year 1971. The decreased dispersion of the data is attributable to the decrease of the values in the last month of the fiscal years and the increase in the values of the earlier months. Table 2 of Exhibit O shows that the mean of the first eleven month values progressively increased from fiscal year 1952 to fiscal year 1971, while the associated standard deviations and coefficient of variability decreased.

Finding Number Four

The pattern of awards showed significant increases in awards at the end of the fiscal year quarters as well as at the year-end through fiscal year 1971. The quarter-end increase was not evident in fiscal years after 1971 except in the third quarter. The last month of the fiscal year quarters are indicated by the symbol Δ in the graphs of Exhibit P.

Exhibit S is a tabulation of the values in a month-of-the-quarter sequence, i.e., first, second, third month of a quarter. In this exhibit the values of the first months of the four fiscal year quarters were summed together to determine the value labeled first quarter month (1st QTR MTH). Similarly, second months were summed together; as were the last months of the four quarters. In the ten years of FY '52-FY '61, the third month-of-the-quarter values averaged

48.6%. During this ten year period, almost one half of the awards were made in the last months of the quarter. During FY '72-FY'76 the average was 38.4%. A even distribution of the values would have been 33.3%.

Exhibit T was developed to further test the condition. Figure 1 of Exhibit T shows the number of monthly award values above and below the median value of the 300 months of the 25 years. The months were sorted into a month-of-the-quarter order as previously described. The figure shows that 145 (51.7%) of the percent values were below 7.5 percent, the median value, and 155 (48.3%) were above 7.5 percent. However, within the 100 values of the last months-of-the-quarter, only 21 (21.0%) were below 7.5 percent while 79 (79.0%) were above 7.5 percent. Obviously, the higher values of the twelfth month of the years (identified in finding two) influenced this test. To eliminate the twelfth month influence, a second test was made with all the values of the fourth quarter removed from the data. Figure 2 shows that 113 (50.2) of the 225 percentage values were below the median of 7.5 percent and 112 (49.8%) were above. The last month-of-the-quarter values (excluding those of the fourth quarter) showed 21 (28.0%) of the values were below the median, while 54 (72.0%) were above. The characteristics of the data were further brought out by Exhibit Q. A dot has been placed within each month group to indicate the median value. These dots indicate that the median values of

the third, sixth, ninth, and twelfth months of the years were higher than those of the other months. Figure 5 of Exhibit P, graphically indicates that the quarter-end condition was not evident in the FY '72-FY '76 period.

Finding Number Five

The shape and variability of the graphs of the award patterns have changed during the 25 years. Graphs of earlier years indicate considerable variability in the monthly awards, with an increase in awards in the later months of the year. The later year patterns were smoother and indicated that the higher award values occurred in the earlier months of the year. The trend of the award values to become progressively larger or smaller during the course of the year may be indicated by the slope of a straight line fitted through a graph of the award values. The shape of the award patterns were evaluated on the basis of free hand sketches of straight lines drawn through the plotted points of the first eleven months of the award pattern graphs (38:464). The slope was measured in this fashion because the technique was adequate to determine significant changes in the slope and because a more precise measure might be misconstrued beyond the intent of the measurement. The twelfth month values were excluded to avoid the biasing effects of the radical year-end award values.

The sawtoothed shape of the earlier years and the smoother shape of the later years may be easily seen in the

graphs of Exhibit P. These graphs also show the free handed lines sketched to indicate the slopes of award patterns. However, the underlying force causing the change can be comprehended better from the Tables of Exhibits O and U.

Exhibit U displays the values in a fiscal year quarter format. If the award values were evenly distributed within the four quarters, each quarter would contain a value of 25.0 (percent). If the value of the first quarter was higher than that of the third quarter, the line of the slope would pivot on the value of the second quarter and slope downward. If the value of the third quarter were higher than that of the first quarter, the slope would be upward. For FY '52-FY '63, the first quarter values averaged 18.56. In the same twelve year period, the values of the third quarter averaged 23.53. During FY '52-FY '63, the third quarter values were higher than those of the first quarter in ten (83.33%) of the twelve years. Therefore, during FY '52-FY '63 the slope was usually upward. During FY '64-FY '76, the first quarter values averaged 25.78. In the same thirteen year period the third quarter values averaged 22.37. For the FY '64-'76 period the third quarter values were higher than the first quarter values in only one (7.69%) of the thirteen years. Therefore, during FY '64-FY '76 the slope was downward. The downward slope of the patterns in the later fiscal years, implies that the values of the later months (excluding the twelfth month) of the year were lower than the mean values of the first eleven months.

The shift in the slope of the patterns may be attributed primarily to increases in the values of the first two months of the fiscal years. Table 1 of Exhibit O was developed by combining the values of the first and second months of the fiscal years and averaging the combined values over successive five year periods. Table 1 shows the mean value rose from 10.04 in the FY '52-FY '56 period to a mean value of 18.56 in the FY '72-FY '76 period. If the combined value of the two months was evenly divided, the value of the first two months of the fiscal year would have averaged 9.26 during the FY '72-FY '76 period. Table 1 suggests that the increase in the values of the first two months was progressive; however, a scan of Exhibit B indicates a break point occurred between FY '63 and FY '64. During FY '52-FY '63 the values of the first month averaged 5.73; the values of the second month averaged 4.98.

During FY '64-FY '76, the values of the first month averaged 8.53, and those of the second month average 8.38. If all the values of contract awards in the first eleven months had an average value above 8.33, then a consistent surge in the values of the twelfth month could not have occurred. The mean value of contract awards in the first and second months increased more than those of any other month or group of months during the 25 year period. The increased values in the first two months occurred at the same time as the decrease in the year-end contract awards.

Summary

The amount of contract dollars awarded in the last month of the fiscal years was consistently much larger than the typical amounts awarded in the preceding eleven months of the year. The magnitude of the difference in the amount of contract dollars awarded in the last month, and the sharp increase in the amounts at the year-end relative to the pattern of awards in the preceding months was considered to have illustrated that year-end spending surge was a common occurrence in the DOD during fiscal years 1952 to 1976.

The percentage of total contract dollars awarded in the last month of the fiscal years decreased on a fairly regular basis during the decades of the 1950's and the 1960's. The last month award percentage values for the first six years of the 1970's showed that the year-end surge did not continue to ameliorate during the decade of the 1970's.

The decrease in the last month percentage values was seen to have occurred with an increase in the relative size and uniformity of the awards made in the earlier months of the fiscal years. The decrease in the amount of the variability in the month-to-month awards indicated a reduction of disruptive factors that would impede the smooth operation of the procurement process. It appears reasonable to believe that the growth and the leveling of the award amounts in the earlier months were a precipitating condition to the decrease in the last month award amounts. It is axiomatic

that stabilization within a system permits a higher degree of system behavior prediction and control (37:101).

The influence of the month-of-the-quarter relationship between the value of the contract awards and the sequence of the months in the quarter was seen to have been a contributing factor to the increased variability of the contract award values during the earlier years. The end-of-the-quarter surge phenomenon observed during the earlier years appears to have been a microcosm of year-end surge. When viewed in a graphic form, these two surge phenomena appeared to exhibit common traits. Each pattern indicated a distinctive ebbing of the values during the middle period and a surge in the last month. The underlying factors which caused the surges may also share common traits. If the factors which caused the end-of-the-quarter surges are of the same ilk as the factors which cause year-end surge, then the search for the prescription to eliminate the year-end surges might be advanced by an examination of the prescriptions which eliminated the quarter-end surges. Unfortunately, this study cast no light on the events which precipitated the reduction in the quarter-end surges, or which reduced the erratic fluctuations in the award values of the earlier fiscal years. However, the events, the reductions in the fluctuations, and the decrease in the year-end surge levels appear to have been interrelated.

Conclusions

This study documented the patterns of the DOD contract awards during the 25 year period of fiscal years 1952 to 1976 as they may be viewed from quantative data. The study did not examine the factors which influenced the patterns of the contract awards. Therefore, the following conclusions are presented within the context of the data studied.

1. The DOD consistently experienced a year-end surge in the amount of contract dollars awarded during the 25 year period. The pattern of the contract awards and the scale of the year-end surge was representative of those characterized as being influenced by year-end surge factors.

2. The magnitude of the DOD year-end surge progressively decreased during the decades of the 1950's and 1960's. The progressive decreases ceased in the late 1960's and then the magnitude of the surge began to increase during the early 1970's.

3. The decreases in the magnitude of the DOD year-end surges during the 1950's and 1960's are attributed to a growth and leveling of the values of the contracts awarded during the earlier months of the fiscal years, and to the decreases in the amount of surge in the contracts awarded at the end of the fiscal year quarters.

4. The decrease in the value of the contracts awarded during the last months of the fiscal years was

complemented by an increase in the value of the contracts awarded in the first and second months of the fiscal years. The most prominent features of the DOD contract award patterns of the early 1970's were the high values of the contract dollars awarded in the first, second, and twelfth months. The higher values of these months are related to the beginning and ending of the DOD budget execution cycle.

Recommended Future Research

This study analyzed data indicating the results of the contract award process, rather than the factors which controlled the process. It was implicitly assumed that an isomorphic relationship existed between the analyzed data and the performance of the process and its controlling factors. However, the information drawn from the quantative data was inadequate to explain the changes in the contract award patterns. Further research is needed to obtain a knowledge of the controlling factors which caused the process to perform as it did.

There appears to be reason to believe that the noteable improvements in the DOD contract award patterns of the FY '63-FY '64 time period may be related to the establishment of the DLA in FY '62. The DLA, which is primarily operated with stock funds annually awards ten to twelve percent of the total DOD contract dollars (13:28-31). A limited review of the DLA award patterns indicated that the

DLA awards a minor percentage of its contracts during the last quarter of a fiscal year, and that it does not experience a year-end surge (14:6). Information obtained from OMB personnel and GAO reports suggest that the DLA does not experience a year-end surge because the working capital of its stockfund operates to buffer the DLA contract award process from the influences of the DOD budget cycle. The stockfund procedures would also tend to buffer the DLA operations from the apportionment and allocation processes of the DOD budget execution process.

When the DLA's contract award pattern was discussed with Mr. Mathew Conroy, an OMB budget examiner, he indicated "there is no reason for a stockfund (agency) to have a year-end surge [19]." Further, Mr. Conroy and Mr. Bianca, an OMB budget analyst, both indicated that quarter-end surges observed in the DOD contract award patterns of the earlier years studied were probably related to the quarterly allocation aspects of the apportionment process.

A 1976 GAO report entitled "27 Years of Experience With Stock funds", describes events leading up to the establishment of stockfunds within the DOD. In describing the factors and conditions which precipitated the establishment of the stockfunds, the 1976 report cites the following quotation from a 1949 GAO report,

> . . . it becomes increasingly more obvious that the excessive use of detailed administrative allotments as the basis for administering programs

> under appropriated funds is a significant factor in the confused and unsatisfactory situation with respect to financial control in the Department of Defense [8:13].

The 1976 GAO report further stated that stock funds give DOD managers more flexibility, the ability to meet unforeseen conditions, and the possibility to achieve economies by freeing the agency operations from the appropriation cycle (8:18). The report includes comments indicating that the stockfund operations have not realized their potential benefits because of Congressional and agencies' policies which restrain the flexibility of the program operations (8:2).

The discussion regarding the DLA and the funding procedures should not be misconstrued to offer a comprehensive explanation for the changes in the DOD contract award patterns. Other factors which may have influenced the contract award patterns include:

1. Legislative and executive branch directives.

2. Organizational changes within the DOD procurement system.

3. The increased use of electronic data processing equipment.

4. The trend toward the procurement of high technology, major weapons systems through the placement of a small number of very high dollar contracts[1], i.e., large missile, aircraft, aircraft carrier, nuclear submarine programs, etc.

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[1]In FY '80 the award of 56 contracts, individually valued in excess of $50 million, accounted for 23.6 percent of the Navy's total contract award dollars (25:4-9).

5. The drawdown of military personnel and the increased reliance on contracted efforts for services previously done by military personnel.

DEPARTMENT OF DEFENSE CONTRACT AWARDS*
BY FISCAL YEARS AND FISCAL YEAR MONTHS
1952 TO 1976

Fiscal Year	1 JUL	2 AUG	3 SEPT	4 OCT	5 NOV	6 DEC	7 JAN	8 FEB	9 MAR	10 APR	11 MAY	12 JUNE	TOTAL
1952	$2946	$2180	$1834	$2295	$2074	$3413	$2505	$3961	$3003	$2067	$3022	$12182	$41482
1953	828	524	1684	1729	2000	3202	3557	1675	2521	2418	1995	5689	27822
1954	1441	585	810	771	164	408	581	416	909	1039	1286	3038	11448
1955	622	425	2012	1817	302	967	962	969	1191	1414	807	3442	14930
1956	693	771	573	903	1042	2985	1205	1107	1767	980	1358	4366	17750
1957	841	1325	2081	1569	1528	2518	1394	1519	1817	1637	594	2310	19133
1958	1114	850	1283	1279	1417	2186	1647	939	2602	1524	2322	4682	21845
1959	1067	1032	2243	1538	1301	2875	1223	1483	2258	1665	1425	4634	22744
1960	1534	1252	1728	1732	1559	1488	1448	1366	2199	1293	1708	3995	21302
1961	1524	1496	2158	1213	1455	2056	1573	1712	2233	1780	1417	4375	22992
1962	1415	1596	1970	2349	1715	2482	2760	1697	2800	1757	1676	3930	26147
1963	1404	1800	2068	2774	2298	1907	2140	2131	2654	1714	2009	4244	27143
1964	1749	2341	2649	2083	1328	1929	2138	2377	2001	2124	2210	3292	26221
1965	2108	1685	2268	1764	1594	1734	1841	1446	2344	2478	1827	4192	25281
1966	1965	2449	2561	2595	2286	2639	2590	2264	2682	2922	2653	6420	34026
1967	3638	2686	3725	3088	2525	3115	2922	3092	2670	2578	3360	6410	39809
1968	3283	3214	3988	3353	2512	2977	2505	2598	2819	3005	3733	5499	39486
1969	3614	2728	4158	3668	2507	3498	2880	2797	2383	2128	2435	4535	37331
1970	2878	2626	2931	3094	1955	2538	2397	2118	2295	1928	1951	4480	31191
1971	2607	2435	2355	3693	1957	2888	2054	2083	2682	2046	1663	3745	30208
1972	2994	2843	3007	2519	2303	2872	3041	2335	2627	1977	2014	4475	33007
1973	3121	2376	2510	2718	2690	2325	2129	2169	2644	1623	1994	4348	30647
1974	2126	2934	2760	2892	2604	2729	2693	2351	2222	2596	1970	5357	33234
1975	3333	3611	3115	3353	2763	2177	2939	2811	2284	2658	2347	5724	37115
1976	3941	4771	2565	2827	2128	2538	2632	2135	3961	2267	2149	5680	37594

*Current dollars in Millions.

Exhibit M

DEPARTMENT OF DEFENSE CONTRACT AWARDS*
BY FISCAL YEARS AND FISCAL YEAR MONTHS
1952 TO 1976

Fiscal Year	1 JUL	2 AUG	3 SEPT	4 OCT	5 NOV	6 DEC	7 JAN	8 FEB	9 MAR	10 APR	11 MAY	12 JUN
1952	7.1	5.3	4.4	5.5	5.0	8.2	6.0	9.5	7.2	5.0	7.3	29.4
1953	3.0	1.9	6.1	6.2	7.2	11.5	12.8	6.0	9.1	8.7	7.2	20.4
1954	12.6	5.1	7.1	6.7	1.4	3.6	5.1	3.6	7.9	9.1	11.2	26.5
1955	4.2	2.8	13.5	12.2	2.0	6.5	6.5	6.5	8.0	9.5	5.4	23.1
1956	3.9	4.3	3.2	5.1	5.9	16.8	6.8	6.2	10.0	5.5	7.7	24.6
1957	4.4	6.9	10.9	8.2	8.0	13.2	7.3	7.9	9.5	8.6	3.1	12.1
1958	5.1	3.9	5.9	5.9	6.5	10.0	7.5	4.3	11.9	7.0	10.6	21.4
1959	4.7	4.5	9.9	6.8	5.7	12.6	5.4	6.5	9.9	7.3	6.3	20.4
1960	7.2	5.9	8.1	8.1	7.3	7.0	6.8	6.4	10.3	6.1	8.0	18.8
1961	6.6	6.5	9.4	5.3	6.3	8.9	6.8	7.4	9.7	7.7	6.2	19.0
1962	5.4	6.1	7.5	9.0	6.6	9.5	10.6	6.5	10.7	6.7	6.4	15.0
1963	5.2	6.6	7.6	10.2	8.5	7.0	7.9	7.9	9.8	6.3	7.4	15.6
1964	6.7	8.9	10.1	7.9	5.1	7.4	8.2	9.1	7.6	8.1	8.4	12.6
1965	8.3	6.7	9.0	7.0	6.3	6.9	7.3	5.7	9.3	9.8	7.2	16.6
1966	5.8	7.2	7.5	7.6	6.7	7.8	7.6	6.7	7.9	8.6	7.8	18.9
1967	9.1	6.7	9.4	7.8	6.3	7.8	7.3	7.8	6.7	6.5	8.4	16.1
1968	8.3	8.1	10.1	8.5	6.4	7.5	6.3	6.6	7.1	7.6	9.5	13.9
1969	9.7	7.3	11.1	9.8	6.7	9.4	7.7	7.5	6.4	5.7	6.5	12.1
1970	9.2	8.4	9.4	9.9	6.3	8.1	7.7	6.8	7.4	6.2	6.3	14.4
1971	8.6	8.1	7.8	12.2	6.5	9.6	6.8	6.9	8.9	6.8	5.5	12.4
1972	9.1	8.6	9.1	7.6	7.0	8.7	9.2	7.1	8.0	6.0	6.1	13.6
1973	10.2	7.8	8.2	8.9	8.8	7.6	6.9	7.1	8.6	5.3	6.5	14.2
1974	6.4	8.8	8.3	8.7	7.8	8.2	8.1	7.1	6.7	7.8	5.9	16.1
1975	9.0	9.7	8.4	9.0	7.4	5.9	7.9	7.6	6.2	7.2	6.3	15.4
1976	10.5	12.7	6.8	7.5	5.7	6.8	7.0	5.7	10.5	6.0	5.7	15.1

*Monthly Percentage of Annual Totals

Exhibit N

DOD CONTRACT AWARD STATISTIC
FISCAL YEARS 1952 TO 1976

Fiscal year	Mean	Standard deviation	Coefficient of Variation
Table 1 Average Combined Values of Months 1 and 2			
1952 to 1956	10.04	5.08	48.86
1957 to 1961	11.14	2.00	17.57
1962 to 1966	13.38	1.85	13.85
1967 to 1971	16.70	.67	4.02
1972 to 1976	18.56	2.91	15.68
1952 to 1976	13.96	4.23	30.33
Table 2 Average Values of First 11 Months			
1952 to 1956	6.84	3.12	45.57
1957 to 1961	7.42	2.16	29.04
1962 to 1966	7.67	1.36	17.68
1967 to 1971	7.84	1.42	18.14
1972 to 1976	7.74	1.46	18.87
1952 to 1976	7.50	2.03	27.12
Table 3 Average Values of the Twelfth Month of the Years			
1952 to 1956	24.80	3.40	13.71
1957 to 1961	18.34	3.65	19.90
1962 to 1966	15.74	2.30	14.61
1967 to 1971	13.78	1.62	11.76
1972 to 1976	14.88	.99	6.64
1952 to 1976	17.51	4.67	26.69
Table 4 Average Values of the Entire 12 Months			
1952 to 1956	8.33	5.89	70.69
1957 to 1961	8.33	3.80	45.57
1962 to 1966	8.33	2.67	31.98
1967 to 1971	8.33	2.19	26.24
1972 to 1976	8.33	2.49	29.37

*All values are percentages of applicable award totals.

Exhibit O

PERCENT OF AWARDS BY FISCAL MONTH

Figure 1. Composite of FY1952-1956 DOD Contract Awards

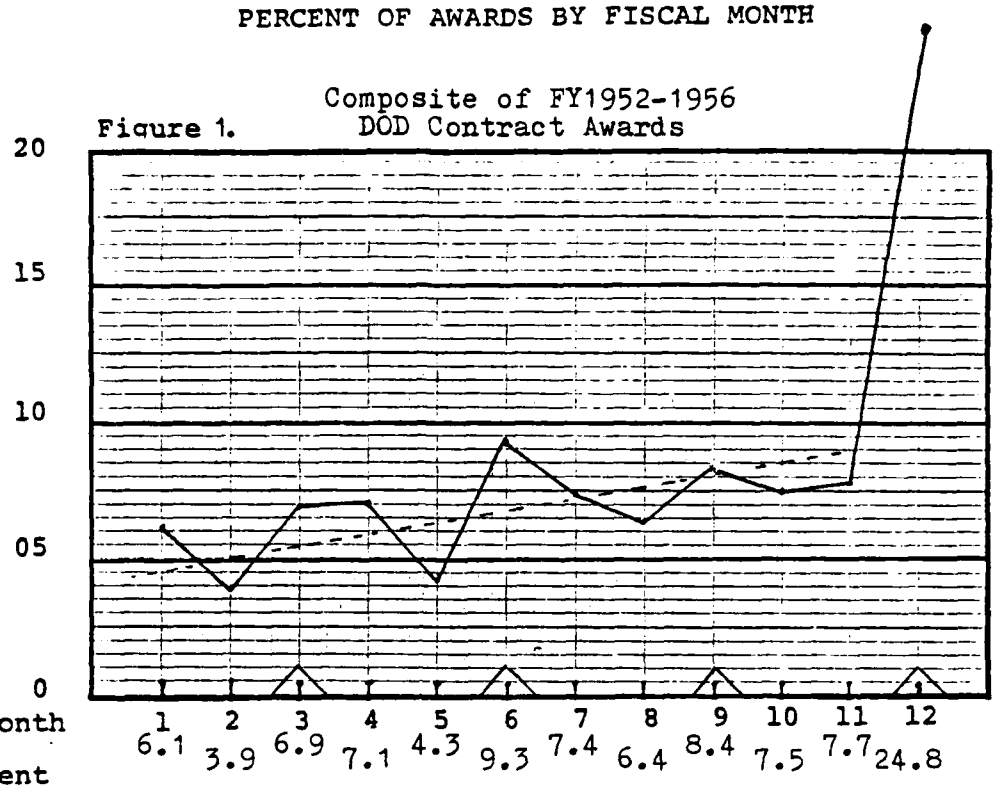
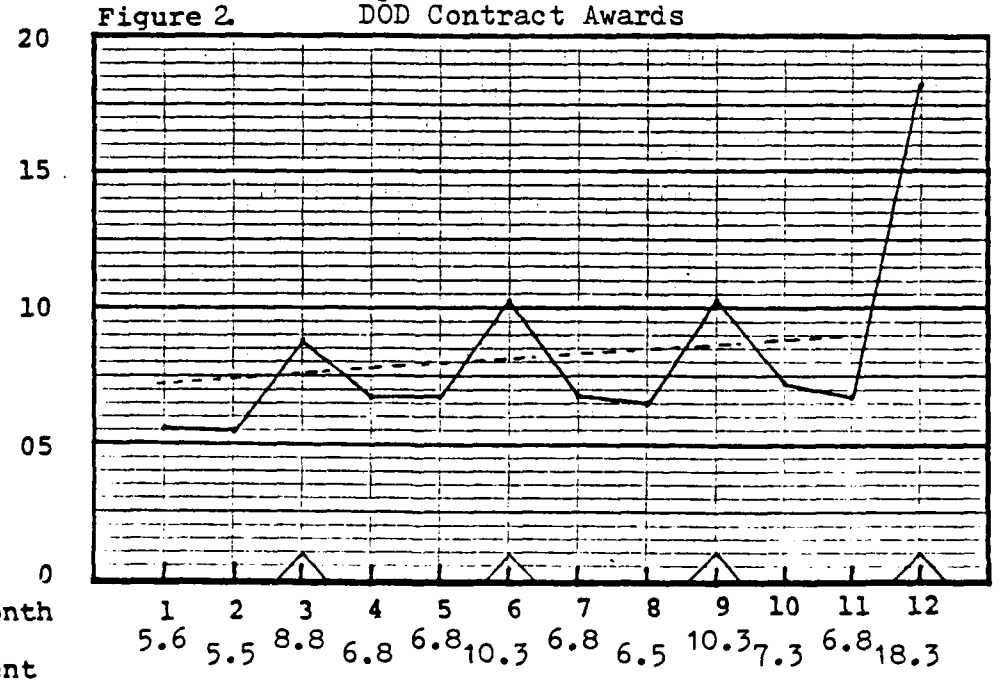
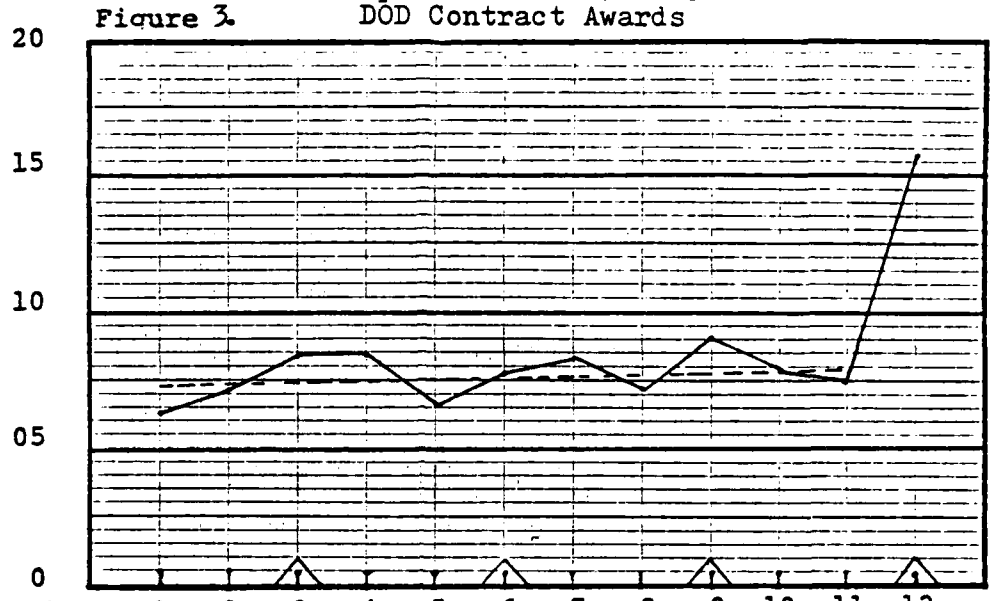


Figure 2. Composite of FY1957-1961 DOD Contract Awards



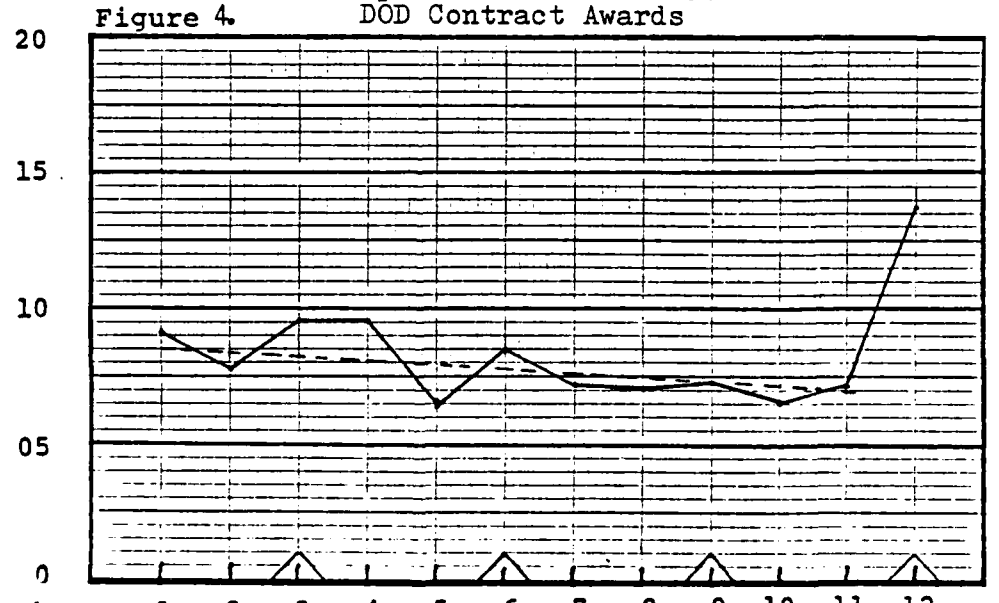
PERCENT OF AWARDS BY FISCAL MONTH

Figure 3. Composite of FY1962-1966 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	6.3	7.1	8.4	8.4	6.6	7.7	8.3	7.2	9.1	7.9	7.5	15.7

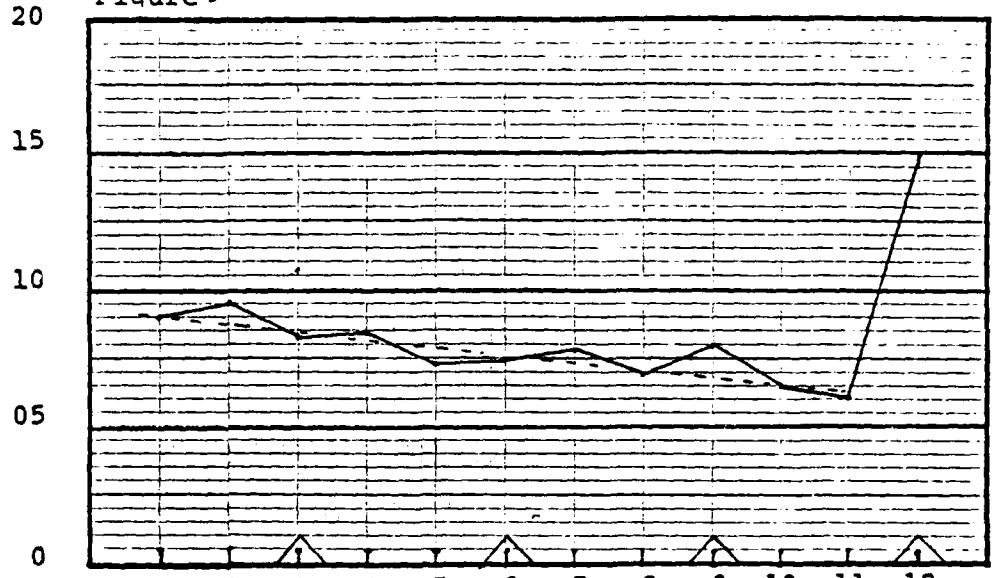
Figure 4. Composite of FY1967-1971 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	9.1	7.7	9.6	9.6	6.4	8.5	7.2	7.1	7.3	6.5	7.2	13.8

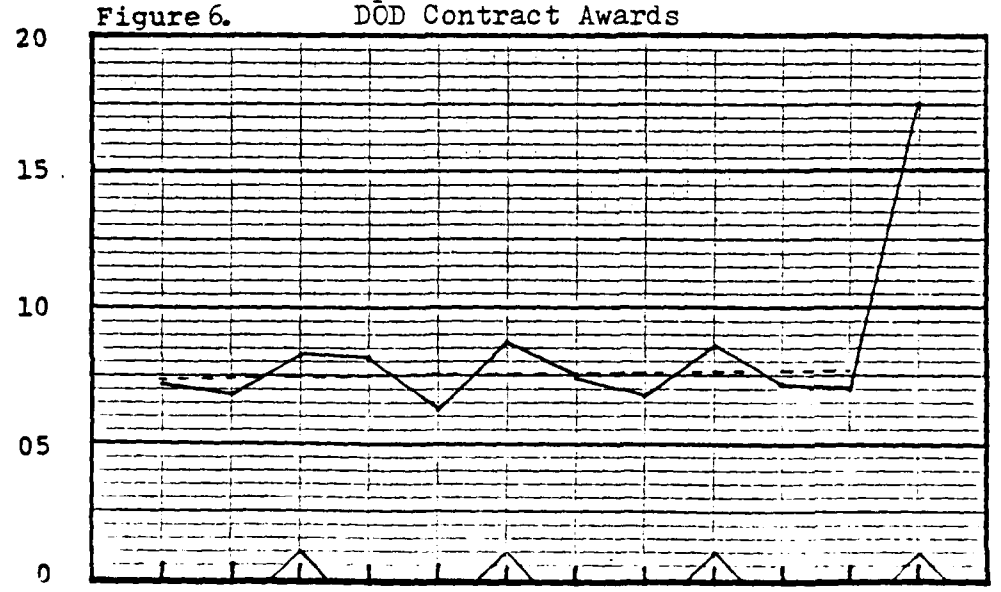
PERCENT OF AWARDS BY FISCAL MONTH

Figure 5. Composite of FY1972-1976 DOD Contract Awards

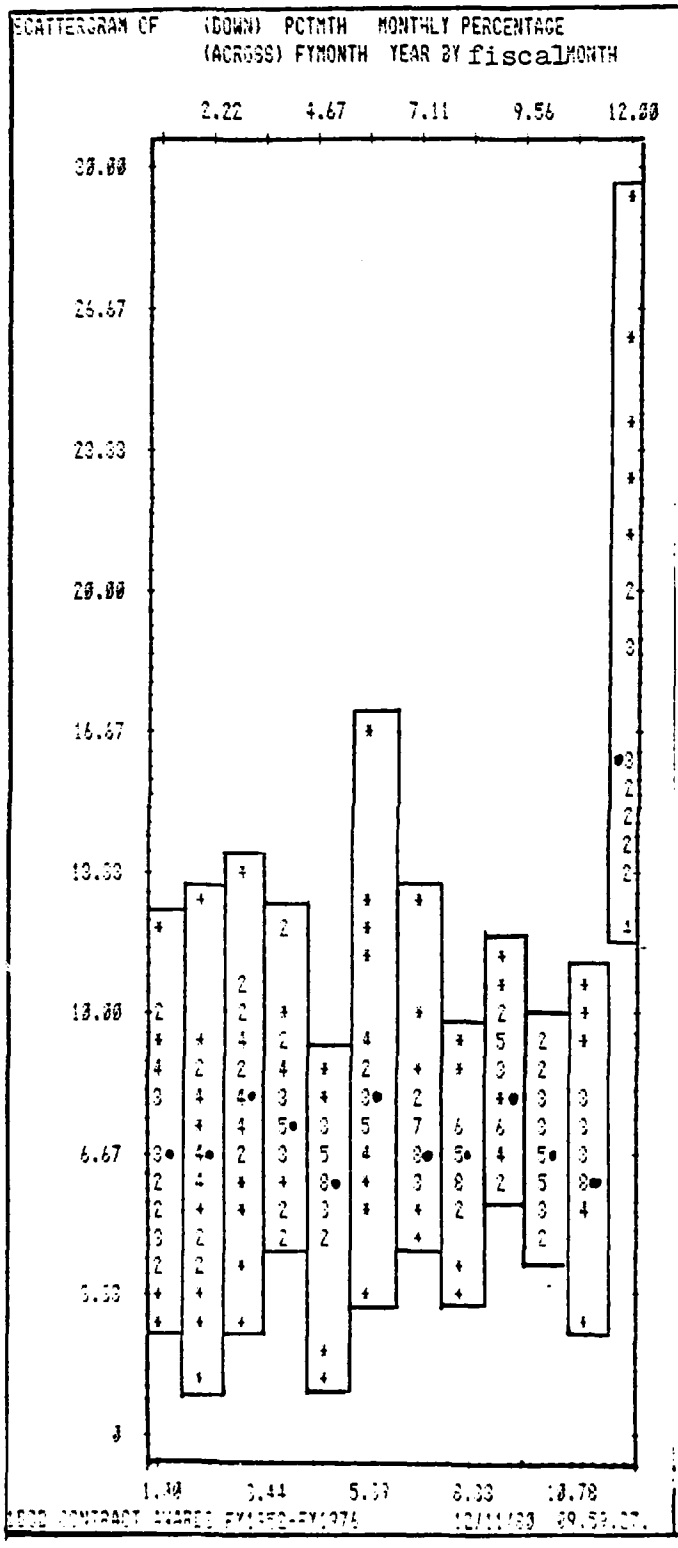


Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	9.0	9.5	8.2	8.4	7.3	7.4	7.8	6.9	8.0	6.5	6.1	14.9

Figure 6. Composite of FY1952-1976 DOD Contract Awards



Month	1	2	3	4	5	6	7	8	9	10	11	12
Percent	7.2	6.8	8.3	8.1	6.3	8.7	7.5	6.8	8.6	7.2	7.1	17.5



This exhibit is a scattergram of DOD contracts awarded during fiscal years 1952 through 1976.

The scattergram was intended to indicate the dispersion of the awards within each month period.

The sequence of months is July through June.

The values plotted are the monthly percentages of the total contracts awarded in each of the 25 years.

The dots identify the location of the median values within each month period.

Legend

*: Individual observations
Numbers: Number of observations of equal value.

Exhibit Q

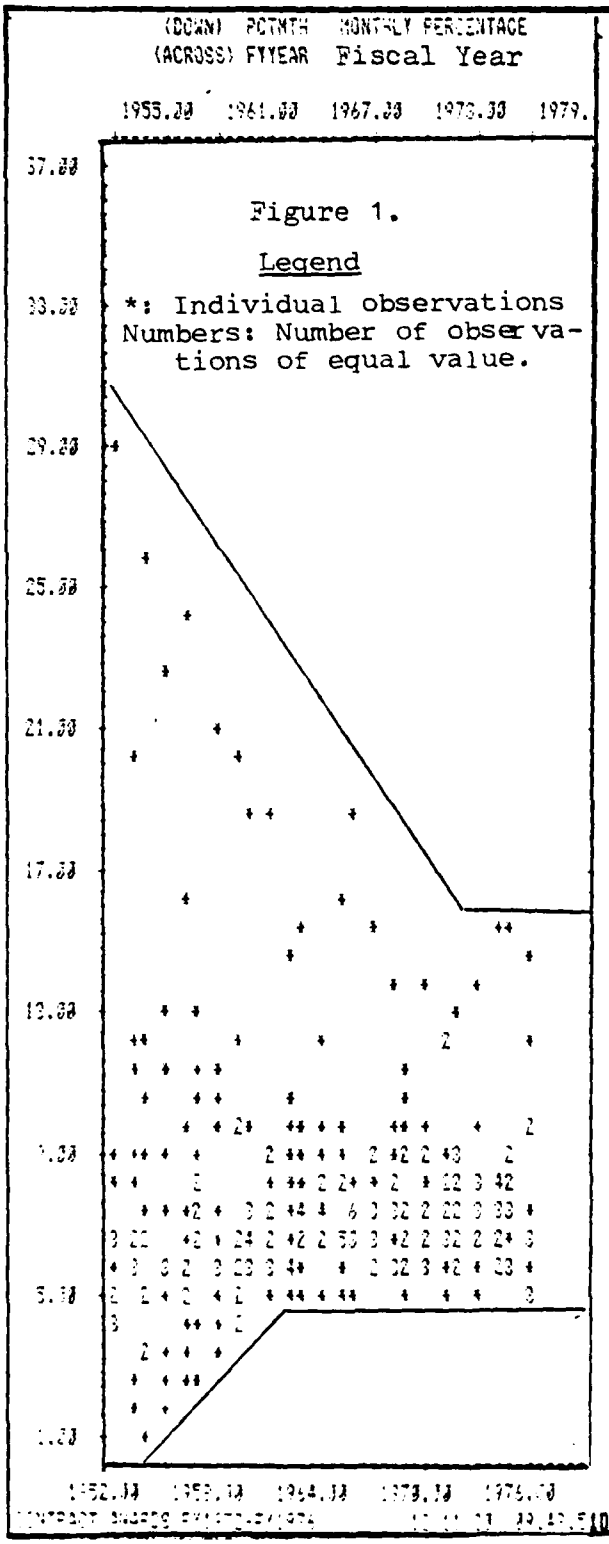


Figure 1.

Legend

*: Individual observations
Numbers: Number of observations of equal value.

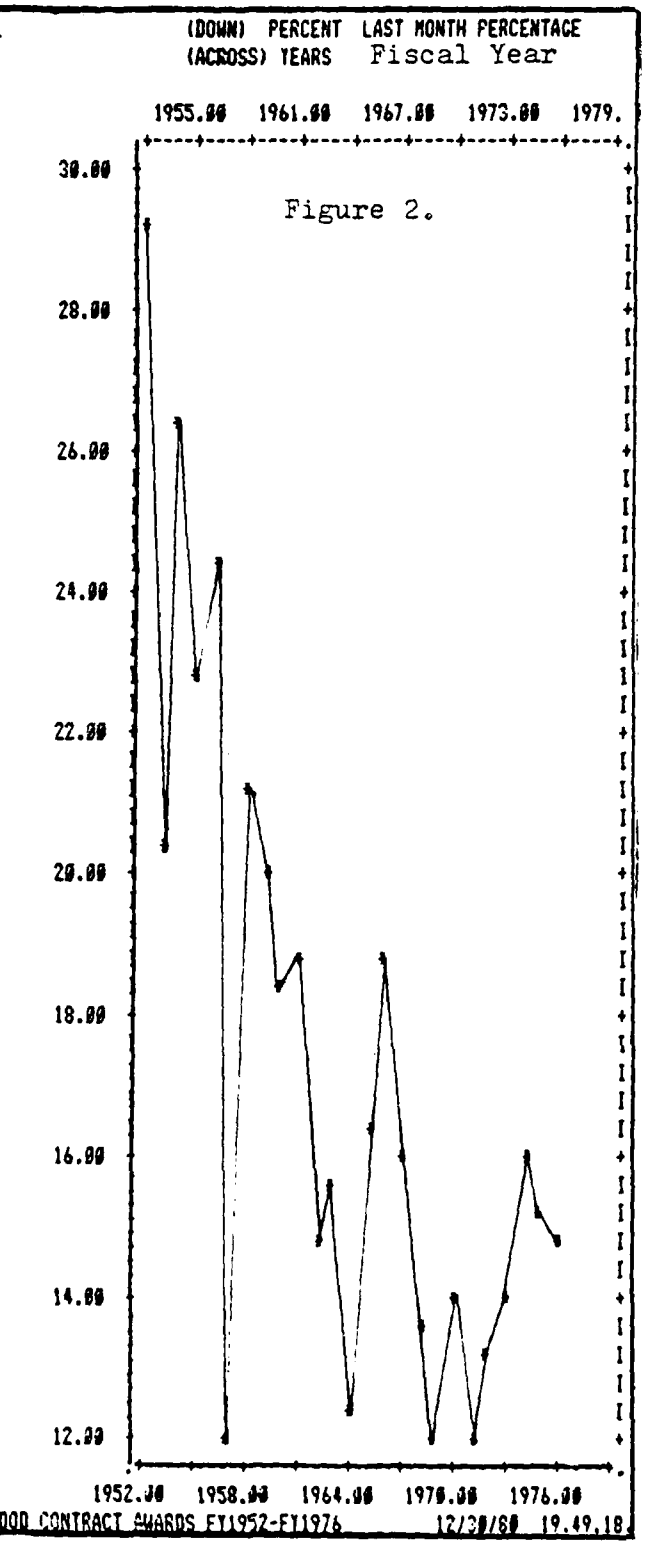


Figure 2.

Exhibit R

********* CROSSTABULATION OF DOD CONTRACT AWARDS

FYMONTH MONTH-OF-THE-QUARTER
BY YEAR FISCAL YEAR

YEAR COUNT COL PCT	FY1952	FY1953	FY1954	FY1955	FY1956	FY1957	FY1958	FY1959	FY1960	FY1961
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
FYMONTH										
1. 1ST QTR MTH	9813 23.7	8532 30.7	3832 33.5	4815 32.3	3781 21.3	5441 28.4	5564 25.5	5493 24.2	6007 28.2	6090 26.5
2. 2ND QTR MTH	11237 27.1	6194 22.3	2451 21.4	2503 16.8	4278 24.1	4966 26.0	5528 25.3	5241 23.0	5885 27.6	6080 26.4
3. 3RD QTR MTH	20432 49.3	13096 47.1	5165 45.1	7612 51.0	9691 54.6	8726 45.6	10735 49.2	12010 52.8	9410 44.2	10822 47.1
COLUMN	41482	27822	11448	14930	17750	19133	21827	22744	21302	22992

YEAR COUNT COL PCT	FY1962	FY1963	FY1964	FY1965	FY1966	FY1967	FY1968	FY1969	FY1970	FY1971
	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
FYMONTH										
1. 1ST QTR MTH	8281 31.7	8032 29.6	8094 30.9	8191 32.4	10072 29.6	12226 30.7	12146 30.8	12290 32.9	10297 33.0	10400 34.4
2. 2ND QTR MTH	6684 25.6	8238 30.4	8256 31.5	6552 25.9	9652 28.4	11663 29.3	12057 30.5	10467 28.0	8650 27.7	8138 26.9
3. 3RD QTR MTH	11182 42.8	10873 40.1	9871 37.6	10538 41.7	14302 42.0	15920 40.0	15283 38.7	14574 39.0	12244 39.3	11670 38.6
COLUMN	26147	27143	26221	25281	34026	39809	39486	37331	31191	30208

YEAR COUNT COL PCT	FY1972	FY1973	FY1974	FY1975	FY1976
	21.	22.	23.	24.	25.
FYMONTH					
1. 1ST QTR MTH	10531 31.9	9591 31.3	10307 31.0	12283 33.1	11667 31.0
2. 2ND QTR MTH	9495 28.8	9229 30.1	9859 29.7	11532 31.1	11183 29.7
3. 3RD QTR MTH	12981 39.3	11827 38.6	13068 39.3	13300 35.8	14744 39.2
COLUMN	33007	30647	33234	37115	37594

LEGEND
Columns: Fiscal Years
Rows: Month-of-the-Quarter
CELLS
Top: $ Millions
Bottom: Percentage of year total by Month-of-the-Quarter

Exhibit S

Crosstabulation of DOD Contract Awards
by Month-of-the-Quarter and Relative Frequency
of Values Above and Below the Median
(see Appendix A, Finding No. Four)

Figure 1.

PCTMTH			
COUNT / ROW PCT / COL PCT / TOT PCT	< 7.5% 1.I	> 7.5% 2.I	ROW TOTAL
FYMONTH			
1. 1ST QTR MTHI	51 / 51.0 / 35.2 / 17.0	49 / 49.0 / 31.6 / 16.3	100 / 33.3
2. 2ND QTR MTHI	73 / 73.0 / 50.3 / 24.3	27 / 27.0 / 17.4 / 9.0	100 / 33.3
3. 3RD QTR MTHI	21 / 21.0 / 14.5 / 7.0	79 / 79.0 / 51.0 / 26.3	100 / 33.3
COLUMN TOTAL	145 / 48.3	155 / 51.7	300 / 100.0

Figure 2.

PCTMTH			
COUNT / ROW PCT / COL PCT / TOT PCT	< 7.5% 1.I	> 7.5% 2.I	ROW TOTAL
FYMONTH			
1. 1ST QTR MTHI	36 / 48.0 / 31.9 / 16.0	39 / 52.0 / 34.8 / 17.3	75 / 33.3
2. 2ND QTR MTHI	56 / 74.7 / 49.6 / 24.9	19 / 25.3 / 17.0 / 8.4	75 / 33.3
3. 3RD QTR MTHI	21 / 28.0 / 18.6 / 9.3	54 / 72.0 / 48.2 / 24.0	75 / 33.3
COLUMN TOTAL	113 / 50.2	112 / 49.8	225 / 100.0

Exhibit T

CROSSTABULATION OF DOD CONTRACT AWARDS
Fiscal Years by Fiscal Year Quarters

COL PCT	FY1952	FY1953	FY1954	FY1955	FY1956	FY1957	FY1958	FY1959	FY1960	FY1961
FYMONTH	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.	6960	3036	2836	3059	2037	4247	3247	4342	4514	5178
1ST QUARTER	16.8	10.9	24.8	20.5	11.5	22.2	14.9	19.1	21.2	22.5
2.	7782	6931	1343	3086	4930	5615	4864	5714	4779	4724
2ND QUARTER	18.8	24.9	11.7	20.7	27.8	29.3	22.3	25.1	22.4	20.5
3.	9469	7753	1906	3122	4079	4730	5188	4964	5013	5518
3RD QUARTER	22.8	27.9	16.6	20.9	23.0	24.7	23.8	21.8	23.5	24.0
4.	17271	10102	5363	5663	6704	4541	8528	7724	6996	7572
4TH QUARTER	41.6	36.3	46.8	37.9	37.8	23.7	39.1	34.0	32.8	32.9
COLUMN	41482	27822	11448	14930	17750	19133	21827	22744	21302	22992

COL PCT	FY1962	FY1963	FY1964	FY1965	FY1966	FY1967	FY1968	FY1969	FY1970	FY1971
FYMONTH	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1.	4981	5272	6739	6861	6975	10049	10485	10500	8435	7397
1ST QUARTER	19.0	19.4	25.7	24.0	20.5	25.2	26.6	28.1	27.0	24.5
2.	6546	6979	5340	5892	7520	8720	8842	9673	7587	8538
2ND QUARTER	25.0	25.7	20.4	20.1	22.1	21.9	22.4	25.9	24.3	28.3
3.	7257	6925	6516	5631	7536	8684	7922	8060	6810	6819
3RD QUARTER	27.8	25.5	24.9	22.3	22.1	21.8	20.1	21.6	21.8	22.6
4.	7363	7967	7626	8497	11995	12348	12237	9098	8359	7454
4TH QUARTER	28.2	29.4	29.1	33.6	35.3	31.0	31.0	24.4	26.8	24.7
COLUMN	26147	27143	26221	25281	34026	39809	39486	37331	31191	30298

COL PCT	FY1972	FY1973	FY1974	FY1975	FY1976
FYMONTH	21.	22.	23.	24.	25.
1.	8844	8007	7820	10059	11277
1ST QUARTER	26.8	26.1	23.5	27.1	30.0
2.	7694	7733	8225	8293	7493
2ND QUARTER	23.3	25.2	24.7	22.3	19.9
3.	8003	6942	7266	8034	8728
3RD QUARTER	24.2	22.7	21.9	21.6	23.2
4.	8466	7965	9923	10729	10096
4TH QUARTER	25.6	26.0	29.9	28.9	26.9
COLUMN	33007	30647	33234	37115	37594

LEGEND

Columns: Fiscal Years
Rows: Fiscal Year Quarters
Cells
Top: $ Millions
Bottom: Percentage of Year Total

Exhibit U

APPENDIX B

DEPARTMENT OF DEFENSE BUDGET EXECUTION

Introduction

In broad terms, the year-end spending surge is a phenomenon which occurs within the framework of the Federal budget execution process. Since this thesis effort is a study of year-end spending surge in the DOD, this brief review has been included to provide the reader with an understanding of the budget process, within which the year-end spending surge occurs. The review includes an overview of the Federal budget process followed by a discussion of DOD appropriations and some of the basic elements of DOD budget execution. This description was not intended to be a detailed presentation of the extremely complex budget process, but rather, was intended to familiarize the reader with the concepts and terms of the budget process as they relate to year-end spending surge.

The Federal Budget Process

The Federal budget process involves four basic phases. In the first phase, agencies in the Executive branch of government develop budget proposals which are incorporated into the National budget or "President's Budget" which is submitted to the Congress annually. Congressional review of the President's Budget and enactment of appropriation legislation comprises phase two. The appropriation legislation specifies

the amount of funds which an agency may obligate the U.S. Treasury to pay for particular goods and services. Also, the legislation[1] specifies the time period during which the funds are available for obligation. The amount of funds for which an agency may obligate the Treasury is called obligation authority. In the third phase, called the apportionment process, the OMB incrementally distributes the obligation authority to the agencies, and they, in turn, distribute the authority to subordinate units. The apportionment process is intended to insure effective and orderly use of appropriated funds. The fourth phase of the process is the review and audit of budget execution by the individual agencies, the Office of Management and Budget and the General Accounting Office (24:1-4; 21:52-55).

The annual budget process also includes a subprocess which allows the President's Budget to be increased, or supplemented, if necessary during budget execution. The review and enactment procedures are abbreviated for the proposed budget supplement. Supplemental appropriation legislation has been traditionally enacted by Congress two to three months prior to the end of the fiscal year. Supplemental appropriations for Operations and Maintenance (O&M) must be obligated in the fiscal year for which they are approved (42:9).

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[1]The target date for final approval of appropriation legislation is September 25th.

Budget Execution

After the appropriation legislation has been enacted into law, the President is charged to insure that Federal agencies comply with the conditions of the legislation. To assist the President in this budget execution role (and in the budget formulation process), the Budget and Accounting Act of 1921 established the Bureau of the Budget, now known as the Office of Management and Budget (OMB). The OMB acts for the President in the oversight and management of the budget execution process through the apportionment of appropriated obligation authority to government agencies (21:52). While the OMB is responsible for the execution of the National Budget, the individual agencies are held accountable for proper execution of their budgets.

DOD Appropriations

Congress has designated appropriation categories to enable the control and accounting of the obligation authority. The DOD appropriations fall into five major categories: Military Personnel, Operations and Maintenance (O&M), Procurement, Military Construction, and Research, Development, Test and Evaluation (RTD&E). Under these major categories, the DOD receives approximately 80 annual appropriations. For example, there are 12 to 14 appropriations for Operations and Maintenance which include discrete appropriations for the active duty, reserve and National Guard components of each of

the Military Services (29:7). The following discussion covers some of the types of goods and services procured with these appropriations and the time period for which each type of appropriation is available for obligation. Since DOD procurement activities do not obligate Military Personnel appropriations, this category has been excluded from the discussion.

Operations and Maintenance

The O&M appropriations finance the day-to-day operations of DOD installations. This obligation authority is used to purchase services and supplies for the maintenance and repair of facilities such as office buildings, family housing areas, roads and runways, and the maintenance and repair of equipment and weapons systems. O&M funds are also used to purchase some inexpensive (normally valued under $1000) equipment items, utilities and fuels. Operations and Maintenance are single year appropriations; they must be obligated during the fiscal year for which they were enacted. For example, O&M obligation authority for FY '80 expired on September 30, 1980 (24:52; 19:3).

Procurement

Purchases of major weapons sytems and associated spare parts, support equipment and technical data are financed by Procurement appropriations. The Procurement category also includes the obligation authority for major purchases of

vehicular, electronic and telecommunications equipment. These appropriations are referred to as multiple year funding because obligation authority is available for use three years after the appropriation becomes effective. An exception to this time limitation is obligation authority for shipbuilding, which is available five years (24:50-51; 19:3).

Research, Development, Test and Evaluation

The RDT&E appropriation provides the funding for research, testing, development and evaluation of proposed weapons systems or major hardware items, the maintenance and advancement of the DOD technology base, and the operation and maintenance of R&D facilities. These appropriations have an obligation "life" of two years (24:53-54; 19:3).

Military Construction

The Military Construction appropriations are used for the acquisition or construction of DOD facilities, installations or public works. Major and minor construction and associated planning, designing and supporting activities are within the scope of these appropriations. Military construction is also a multiple year appropriation available for obligation for five years (24:51; 19:3).

Stock Funds

Since 1947, Congress has authorized the Secretary of Defense to establish a revolving type fund to finance certain

supply inventories. These revolving funds, known as stock funds, were intended to incorporate positive aspects of business practices by creating a buyer-seller relationship between interacting DOD organizations. Designated DOD organizations manage the stock funds assets composed of item inventories, accounts receivables and cash. Inventory items are sold (on account) to consuming operational units. The customer units use O&M funds to pay for items purchased from the stock fund. The O&M funds become part of the cash balance which the fund manager uses to replenish inventories. Stock fund operations (and procurements) are influenced by the Federal budget process. Congress exerts direct control of stock funds through appropriations which subsidize the funds. Also, the appropriations to customer units indirectly affect stock funds (27:Ch.II).

DOD Budget Execution

After the DOD appropriations are enacted into law, a six step process of budget execution begins. First, the OMB and the Office of the Secretary of Defense (OSD) periodically release obligation authority to the various departments and agencies within the DOD. This is known as apportionment. Second, the departments divide (allocate) the apportioned obligation authority to the field commands. For example, the Department of the Air Force allocates to its major commands and operating agencies, i.e., the Strategic Air

Command. Third, the command headquarters divide the obligation authority among their installations or program offices through a process known as allotment. Fourth, the installations and program offices reserve or commit portions of their allotment for anticipated purchases of the goods and services. Fifth, when the installation or program procurement office finalizes the contracts for the goods and services, the Treasury is obligated to make payment upon completion of the contract. Sixth, when the contracted goods and services are delivered, the contractor is paid with a check written against funds in the U.S. Treasury. This final step is called an expenditure (24:29-30; 28:23).

To control the rate at which appropriations are obligated, DOD budget officers normally allot their budget authority into quarterly amounts called targets or ceilings. The main purpose for the ceilings is to prevent over obligation of appropriations (which is illegal) and to facilitate an even flow of U.S. Treasury monies. However, the ceilings are often viewed as obligation goals for two reasons. First, failure to use obligation authority up to the ceiling amount makes the unobligated balances for the period susceptible to transfer by higher echelons to other installations or programs. This transfer of obligation authority is called reprogramming and is subject to Congressional limitations. Second, unobligated balances for a period are sometimes construed to be the end result of poor budget preparation (overstated needs) and cause future budget submissions to be suspect (28:54-55).

Extensive reporting systems have been established to allow DOD financial managers at all levels to monitor and control budget execution. The reports usually highlight the ceiling/goal, the dollar total of obligated and unobligated balances for the report period, and the obligation total expressed as a percentage of the budget, in an attempt to monitor progress toward the established ceiling/goal (28:56).

Congress has criticized the DOD for having large balances of unobligated multiple year appropriations. In response to this criticism, the DOD has established policies requiring that high percentages of the appropriations be obligated during their first year of availability[2] (19). These policies appear to diminish the flexibility of the funds which the multiple year authorizations were intended to provide (42:12).

Budget execution at the end of the fiscal year has been the subject of DOD training courses, policy letters and internal newsletters. Such literature has emphasized the actions which DOD managers can take to insure efficient use of appropriations at the end of the fiscal year. For example, Navy procedures require that unobligated balances of more than three percent be reported to higher headquarters five

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[2]Congress has historically not authorized supplemental increases to multiple year appropriations after the first year of their authorization. Therefore the increased use of funds in the first year may improve the probability that the funds will be supplemented. This is compatible with the philosophy that increased spending indicates increased need (10).

days before the end of each quarter (15). Official Air Force publications encourage budget managers to have procurement requisition documents prepared for use in case additional funds become available at the year-end (31:11-12). An Air Force text details a series of steps which installation commanders should take to develop a fiscal year-end "close-out" plan. The plan is developed and distributed in the tenth month and provides for close coordination between the installation commander, unit financial managers and the procurement office. The status of unobligated balances is tracked daily in the last month (23:141, 143).

Conclusions

The yearly "close-out" procedures result in the release of funds held during the apportionment, allocation, allotment process as management reserves for contingencies. These funds are usually released to program offices and installations for obligation. Contingency funds released during the close-out period are commonly referred to as "fall-out" monies (10).

The DOD budget execution process appears to be highly controlled and carefully monitored to achieve an efficient use of appropriated funds. However, the literature indicates that DOD managers may feel some pressure to obligate all the available funds through fear of losing funds either through reprogramming or because of the doubts which

unobligated balances may cast on the validity of their budget proposals. Some of the guidance also emphasizes the use of available appropriations prior to their expiration, and promotes an awareness that opportunities to procure additional goods or services are to be expected in the year-end period.

The fact that "close out" policies, supplemental appropriations and Congressional and DOD approval of reprogramming make substantial amounts of obligation authority available in the last two months of the fiscal year are recognized features of the DOD budget execution process. The Director of the Office of Federal Procurement Policy, OMB, believes these features are the major contributors to the DOD year-end spending surge (47).

APPENDIX C

DEPARTMENT OF DEFENSE PROCUREMENT

Introduction

Procurement is an integral part of DOD budget execution. This appendix is provided to familiarize the reader with those basic concepts and characteristics of DOD procurement which are germane to an understanding of information presented in this thesis. The discussion which follows includes a definition of procurement, brief descriptions of DOD procurement regulation, types of procurement activities, organization, and funding of DOD purchases.

Definition

The Defense Acquisition Regulation (DAR) defines procurement in the following manner:

> Procurement includes purchasing, renting, leasing or otherwise obtaining supplies or services. It also includes all functions that pertain to the obtaining of supplies or services, including description but not determination of requirements, selection and solicitation of sources, preparation and award of contracts, and all phases of contract administration [12:1-201.13].

As the definition indicates, procurement is that DOD function which obtains required goods and services from private enterprises, institutions and Federal agencies. Procurement functions do not include the determination of requirements, the budgeting and release of funds to initiate the procurements, or the certification of receipt of the items purchased. It is important to note that funded requirements,

the inputs which initiate the procurement actions, originate outside the procurement organization (3:2). Consequently, procurement is reactive to the requirements and budgeting determination functions of the DOD.

DOD Procurement Regulation

Defense procurement is controlled by a substantial body of laws and regulation. Title 10 of the U.S. Code, a codification of the laws relating specifically to the Armed Services; the Armed Services Procurement Act of 1947 as amended; and appropriation legislation all place legal limits on the procurement process. Additionally, all DOD procurement is controlled by the provisions of the Defense Acquisition Regulation (DAR). The DAR is a 26 section set of publications which implement the provisions of the Armed Services Procurement Act of 1947 and subsequent amendments (21: 5-6).

Classification of Procurement Activities

DOD procurement offices have been organized to provide specialization of labor and economies of scale in the procurement of major weapon systems or high volume, common-use items, and to provide responsive support to individual organizations. There are eight classes of purchasing activities in the DOD. The classifications and a brief description of the particular goods and services purchased by each follow:

- Base Support procures supplies and services required for the maintenance and operation of installations and bases. The Base support activities are the greatest in number, and the smallest in individual dollar amounts of procurements.

- Area Support procures supplies and services which are common to a number of bases in a geographic region or which require procurement expertise not available at the installation level.

- Industrial Support provides materials and services required by DOD in-house industrial facilities such as munitions facilities, aircraft overhaul depots and shipyards.

- Supply System Support procures replacement parts for major equipment items and weapons systems, and supplies and services common to all DOD components.

- Weapons Acquisition procures major weapons systems such as tanks, ships, aircraft and missile systems. Weapons acquisitions are the most complex of DOD procurement activities, are relatively small in number, yet their procurements involve the greatest dollar amounts.

- Research and Development obtains research, development, tests, and evaluations of designs for new weapons systems and components. A sizeable proportion of R&D procurement dollars are awarded for the development of engineering and industrial processes which precede the production

of major weapon systems. Theoretical and applied research studies are also procured in this classification.

- Transportation Services provide commercial augmentation of DOD sealift, airlift and land transportation.

- Construction includes design, engineering and construction of new DOD facilities as well as maintenance and repair of existing facilities beyond the capability of DOD civil engineering organizations (3:3-7).

DOD Procurement Organization

The DOD procurement organization is composed of the three service components; Army, Navy and Air Force, and the Defense Logistics Agency (DLA). Each Service component has developed its own organizational structure for procurement, with the eight activity classifications providing a functional basis for these structures. While the exact breakout of functions is unique to each Service, in very general terms, the organizational structures are characterized by two types of procurement functions: central functions and base functions. Within the central functions are the activities of, industrial, and supply system support, weapons acquisition, research and development, transportations services and construction. Base support, area support, and some construction purchases are performed by base procurement functions. The DLA, formerly the Defense Supply Agency, is a central purchasing function for the DOD and is primarily a supply systems

support activity (3:39-65). In 1980, the DOD procurement information system listed 824 purchasing offices. Of these, 382 were central offices and 442 were base offices (18).

Sources of Procurement Funds

The source of funds for DOD purchases are the annual and supplemental appropriations by Congress and stock funds (21:CH.6). By comparing the supplies and services designated in the appropriation categories with the supplies and services purchased by the various procurement activities, it is possible to determine, for most activities, the type(s) of funds obligated by each activity. Weapons acquisition, research and development and construction activities primarily obligate Procurement, RDT&E and Military Construction appropriations, respectively. Base, area, industrial support activities, and transportation services are funded from Operations and Maintenance. Supply systems support activities utilize a combination of Procurement appropriations and stock funds.

APPENDIX D

COMPUTER PROGRAMS

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 L,100,600
100=RUN NAME       DOD CONTRACT AWARDS FY1952-FY1976
 110=VARIABLE LIST  YEAR,FYMONTH,DOLLARS
 120=INPUT FORMAT   FREEFIELD
 130=INPUT MEDIUM   CARD
 140=N OF CASES     UNKNOWN
 150=VAR LABELS     YEAR,FISCAL YEAR/
 160=               FYMONTH,YEAR BY FISCAL YEAR MONTH/
 170=               DOLLARS,PROCUREMENTS IN $MILLIONS
 180=IF             (YEAR EQ 1) TOTAL=41482
 190=IF             (YEAR EQ 2) TOTAL=27822
 200=IF             (YEAR EQ 3) TOTAL=11448
 210=IF             (YEAR EQ 4) TOTAL=14930
 220=IF             (YEAR EQ 5) TOTAL=17750
 230=IF             (YEAR EQ 6) TOTAL=19133
 240=IF             (YEAR EQ 7) TOTAL=21827
 250=IF             (YEAR EQ 8) TOTAL=22744
 260=IF             (YEAR EQ 9) TOTAL=21302
 270=IF             (YEAR EQ 10) TOTAL=22992
 280=IF             (YEAR EQ 11) TOTAL=26147
 290=IF             (YEAR EQ 12) TOTAL=27143
 300=IF             (YEAR EQ 13) TOTAL=26221
 310=IF             (YEAR EQ 14) TOTAL=25281
 320=IF             (YEAR EQ 15) TOTAL=34026
 330=IF             (YEAR EQ 16) TOTAL=39809
 340=IF             (YEAR EQ 17) TOTAL=39486
 350=IF             (YEAR EQ 18) TOTAL=3733?
 360=IF             (YEAR EQ 19) TOTAL=31191
 370=IF             (YEAR EQ 20) TOTAL=30208
 380=IF             (YEAR EQ 21) TOTAL=33007
 390=IF             (YEAR EQ 22) TOTAL=30647
 400=IF             (YEAR EQ 23) TOTAL=33234
 410=IF             (YEAR EQ 24) TOTAL=37115
 420=IF             (YEAR EQ 25) TOTAL=37594
 430=COMPUTE        PERCENT=(DOLLARS/TOTAL)*100
 440=COMPUTE        YEARS=YEAR+1951
 450=COMPUTE        MONTH=FYMONTH
 460=*RECODE        MONTH (1='JUL') (2='AUG') (3='SEP')
 470=               (4='OCT') (5='NOV') (6='DEC')
 480=               (7='JAN') (8='FEB') (9='MAR')
 490=               (10='APR') (11='MAY') (12='JUN')
 500=PRINT FORMATS  PERCENT(3)/MONTH(A)
 510=LIST CASES     CASES=300/VARIABLES=YEARS,MONTH,DOLLARS,PERCENT
 520=VAR LABELS     PERCENT,MONTHLY PERCENTAGE
 530=               /MONTH,FISCAL YEAR QUARTERS
 540=VALUE LABELS   FYMONTH (4) OCT (5) NOV (6) DEC (7) JAN
 550=               (8) FEB (9) MAR (10) APR (11) MAY (12) JUN
 560=               (1) JUL (2) AUG (3) SEP
 570=               /YEAR (1) FY1952 (2) FY1953
 580=               (3) FY1954 (4) FY1955 (5) FY1956
 590=               (6) FY1957 (7) FY1958 (8) FY1959 (9) FY1960
 600=               (10) FY1961 (11) FY1962 (12) FY1963 (13) FY1964
..
```


Exhibit V

```
 L,610,1000
610=               (14) FY1965 (15) FY1966 (16) FY1967 (17) FY1968
620=               (18) FY1969 (19) FY1970
630=               (20) FY1971 (21) FY1972 (22) FY1973
640=               (23) FY1974 (24) FY1975 (25) FY1976
650=CONDESCRIPTIVE DOLLARS,PERCENT
660=STATISTICS     ALL
670=*WEIGHT         DOLLARS
680=CROSSTABS      TABLES=FYMONTH BY YEAR
690=OPTIONS        3,5
700=STATISTICS     ALL
710=READ INPUT DATA
720=*WEIGHT         PERCENT
730=FREQUENCIES    GENERAL= FYMONTH
740=OPTIONS        3,8
750=STATISTICS     ALL
760=*WEIGHT        DOLLARS
770=*RECODE        MONTH (1,2,3=1) (4,5,6=2)(7,8,9=3)(10,11,12=4)
780=VALUE LABELS   MONTH (1) 1ST QUARTER (2) 2ND QUARTER (3) 3RD QUARTER
790=               (4) 4TH QUARTER
800=CROSSTABS      TABLES=MONTH BY YEAR
810=OPTIONS        3,5
820=STATISTICS     ALL
830=*WEIGHT        DOLLARS
840=*RECODE        FYMONTH (1,4,7,10=1)(2,5,8,11=2)(3,6,9,12=3)
850=VALUE LABELS   FYMONTH (1) 1ST QTR MTH (2) 2ND QTR MTH (3) 3RD QTR MTH
860=CROSSTABS      TABLES=FYMONTH BY YEAR
870=OPTIONS        3,5
880=STATISTICS     ALL
890=FINISH
..
```

Exhibit V

```
 L,3470,3880
470=THIS IS MIKES
3480=RUN NAME       DOD PURCHASING ANALYSIS
3490=PRINT BACK     NO
3500=VARIABLE LIST TYPE,FYEAR,FYMONTH,DOLLARS
3510=INPUT FORMAT   FREEFIELD
3520=INPUT MEDIUM   CARD
3530=VAR LABELS     FYEAR,FISCAL YEAR/
3540=               FYMONTH,FISCAL YEAR MONTH/
3550=               TYPE,TYPE OF OFFICE/
3560=               DOLLARS,CURRENT DOLLARS
3570=VALUE LABELS   TYPE (1) USAF TOTAL (2) BASE PROC
3580=               (3) CENTRAL PROC (4) CENTRAL OTHER
3590=               (5) R & D PROC (6) DOD TOTAL/
3600=               FYMONTH (1) OCT (2) NOV (3) DEC
3610=               (4) JAN (5) FEB (6) MAR
3620=               (7) APR (8) MAY (9) JUN
3630=               (10) JUL (11) AUG (12) SEP
3640=SELECT IF      (FYEAR EQ 3 AND TYPE EQ 2)
3650=COMPUTE        FYYEAR=1976+FYEAR
3660=IF             (FYEAR EQ 1) FTR=134.7+(FYMONTH*1.0167)
3670=IF             (FYEAR EQ 2) FTR=146.9+(FYMONTH*.6417)
3680=IF             (FYEAR EQ 3) FTR=154.6+(FYMONTH*1.005)
3690=IF             (FYEAR EQ 4) FTR=167.2+(FYMONTH*1.4167)
3700=COMPUTE       CNSTDOL=100*DOLLARS/FTR
3710=VAR LABELS     CNSTDOL,1972 CONSTANT DOLLARS
3720=CONDESCRIPTIVE DOLLARS,CNSTDOL
3730=STATISTICS     ALL
3740=*WEIGHT        DOLLARS
3750=CROSSTABS      TABLES=FXMONTH BY FYYEAR
3760=OPTIONS        3,5
3770=*WEIGHT        CNSTDOL
3780=CROSSTABS      TABLES=FYMONTH BY FYYEAR
3790=OPTIONS        3,5
3800=*SELECT IF     (FYMONTH LT 12)
3810=CONDESCRIPTIVE DOLLARS,CNSTDOL
3820=STATISTICS     ALL
3830=*SELECT IF     (FYMONTH LT 12)
3840=REGRESSION     VARIABLES=FYMONTH,DOLLARS,CNSTDOL/
3850=               REGRESSION=DOLLARS WITH FYMONTH(2) RESID=0/
3860=               REGRESSION=CNSTDOL WITH FYMONTH(2) RESID=0
3870=STATISTICS     ALL
3880=FINISH
..
```

Exhibit W

```
L,100,480
100=RUN NAME        USAF PROCUREMNTS BY CLAIMANT CODE
 110=PRINT BACK     NO
 120=VARIABLE LIST  TYPE,FYEAR,FYMONTH,DOLLARS
 130=INPUT FORMAT   FREEFIELD
 140=INPUT MEDIUM   CARD
 150=VAR LABELS     FYEAR,FISCAL YEAR/
 160=               FYMONTH,FISCAL YEAR MONTH/
 170=               TYPE,TYPE OF ITEM BOUGHT/
 180=               DOLLARS,CURRENT DOLLARS
 190=VALUE LABELS   TYPE (1) USAF TOTAL (2) BASE PROC
 200=               (3) CENTRAL PROC (4) CENTRAL OTHER
 210=               (101) AIRCRAFT (102) ENGINES (103) AIRCRAFT EQUIP (104) MISSILE
 220=               (105)  SHIPS (106) TANKS (107) CARS (108) GUNS (109) AMMO
 230=               (110) ELTRONIC (111)   POL (112) LUBES (113) PACKING EQUIP
 240=               (114) CLOTHING (115) BUILDING EQUIP (116) FOOD
 250=               (117) RAILROAD EQUIP (118)
 260=               PRODUCT  EQUIP (119) CONSTR (120) CONSTR  EQUIP (121) MEDICAL
 270=               (122) PHOTO (123) HANDLING EQUIP (124) OTHER (125) SERVICES
 280=               (126) UTILTIES (127)   UNDER    $10000
 290=               (6) DOD (7)  AFLC CEN (8) AFLCBASE (9) AFSC CEN
 300=               (10) AFSCBASE (12) AFLCBASE ACTIONS (13) AFLC CEN ACTIONS
 310=               (5) R & D PROC (6) DOD TOTAL/
 320=               FYMONTH (1) OCT (2) NOV (3) DEC
 330=               (4) JAN (5) FEB (6) MAR
 340=               (7) APR (8) MAY (9) JUN
 350=               (10) JUL (11) AUG (12) SEP
 360=               /FYEAR,(1) 1977 (2) 1978 (3) 1979 (4) 1980
 370=SELECT IF      (FYEAR GE 1 AND TYPE GE 99)
 380=COMPUTE        FYYEAR=1976+FYEAR
 390=IF             (FYEAR EQ 1) FTR=134.7+(FYMONTH*1.0167)
 400=IF             (FYEAR EQ 2) FTR=146.9+(FYMONTH*.6417)
 410=IF             (FYEAR EQ 3) FTR=154.6+(FYMONTH*1.05)
 420=IF             (FYEAR EQ 4) FTR=167.2+(FYMONTH*1.4167)
 430=COMPUTE        CNSTDOL=100*DOLLARS/FTR
 440=VAR LABELS     CNSTDOL,1972 CONSTANT DOLLARS
 450=*WEIGHT        CNSTDOL
 460=CROSSTABS      TABLES=FYMONTH BY TYPE BY FYEAR
 470=OPTIONS        5
 480=FINISH
..
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Exhibit X

SELECTED BIBLIOGRAPHY

A. REFERENCES CITED

1. Addabbo, Joseph P., and Jack Edwards. Representatives, U.S. Congress, Washington, D.C. Letter, Subject: Investigation of Department of Defense Procurement Practices, to Jamie L. Whitten, Chairman, House of Representatives Committee on Appropriations, February 2, 1981.

2. Bianca, Chuck. Budget Analyst, Office of Management and Budget, Washington, D.C. Telephone Interview, April 8, 1981.

3. Bleden, Colonel David L., and Ernest G. Cammack. Procurement. Washington, D.C. Industrial College of the Armed Forces, 1973.

4. Brown, Robert. Contract Analyst, Directorate of Contracting and Acquisition Policy, Headquarters, U.S. Air Force, The Pentagon, Washington, D.C. Telephone interview, November 24, 1980.

5. Collins, Susan. Minority Staff Director, Subcommittee on Oversight of Government Management, Committee on Governmental Affairs, U.S. Senate. Telephone interview. October 20, 1980.

6. Comptroller General of the U.S. Federal Year-end Spending: Symptoms of a Larger Problem. GAO Report, PAD-81-18. Gaithersburg, Md: U.S. General Accounting Office, Document Handling Information and Services Facility. October 23, 1980.

7. _____. Government Agencies Need Effective Planning to Cut Unnecessary Year-end Spending. GAO Report, PSAD-80-67. Gaithersburg, Md: U.S. General Accounting Office, Document Handling Information and Services Facility. July 28, 1980.

8. _____. 27 Years' Experience with Defense Industrial Funds. GAO Report FGMSD-76-51. Gaithersburg, MD: U.S. General Accounting Office, Document Handling Information and Services Facility. October 5, 1976.

9. Conroy, Matthew J. Budget Examiner, National Security Division, Office of Management and Budget. Letter, Subject: Air Force Supplemental Appropriations, Fiscal Year 1977-1980, April 9, 1981.

10. _____. Budget Examiner, National Security Division, Office of Management and Budget, Washington, D.C. Telephone interview. April 8, 1981.

11. Croxton, Frederick E. and Dudley J. Crowden. Applied General Statistics. Englewoods Cliffs, NJ: Prentice-Hall, Inc., 1964.

12. Department of Defense. Defense Acquisition Regulation. 1976 Edition. Washington DC: Office of the Assistant Secretary of Defense (Installations and Logistics), 1976.

13. _____. Military Prime Contract Awards: Fiscal Year 1979. Washington Headquarters Service, Directorate for Information Operations and Reports. Washington, DC: U.S. Government Printing Office, March 1980.

14. _____. Military Prime Contract Awards: Fiscal Year 1980. Washington Headquarters Service, Directorate of Information Operations and Reports. Washington, DC: U.S. Government Printing Office, March 1981.

15. _____. Outline of Issues to be Addressed by the Department of Defense (concerning year-end spending), Air Force and Navy comments. Office of the Under Secretary of Defense for Research and Engineering (Acquisition Policy). Washington, DC, 1980.

16. _____. Procurement Coding Manual. DOD 4105.61-M, Vol. I., Washington Headquarters Service, Directorate for Information, Operations and Reports. Revised as of October 1980.

17. _____. Procurement Coding Manual. DOD 4105.61-M, Vol. III, Section III. Washington Headquarters Services, Directorate for Information, Operations, and Reports, Revised as of October 1, 1977.

18. _____. Summary of DOD Purchasing Offices as of July 16, 1980. Washington Headquarters Service, Directorate for Information Operations and Reports.

19. _____. The Process of Budget Execution. Briefing Guide. Washington: Office of the Assistant Secretary of Defense (Comptroller), 1980.

20. Department of the Air Force. "Information Processing Standards for Computer (IPSC)." USAF Pamphlet 300-16. Washington DC: Comptroller of the Air Force, Headquarters USAF, June 28, 1979.

21. _____. Air University, Air Training Command. Government Contract Law, 6th ed., Alabama: Gunter Air Force Station, Extension Course Institute, Course 6607, 1979.

22. _____. "J001 Reporting System." Contracting and Acquisition Newsletter, AFRP 70-1, Vol 17, No 2. August 1980, p. 14.

23. _____. Managing the Air Force. Chapter 1: "Air Force Budget: Execution Process." Air War College, Maxwell AFB, AL, 1979.

24. _____. The Air Force Budget. 10th ed. Washington: Headquarters, USAF. 1978.

25. Department of the Navy. Survey of Contracting Statistics. NAVMAT P-4200. Headquarters, Naval Material Command, Washington, DC, March 1980.

26. Egmand, Michael R. Macroeconomics: Theory and Policy. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1979.

27. Fulton, Captain Darrell N., USAF, and Captain Dwight J. Foster, USAF. DOD Resource Management Systems: System for Managing Inventories (Working Capital Funds). School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB OH, 1978.

28. Fulton, Major Darrell N., USAF and Captain Donald D. Wright, USAF. DOD Resource Management Systems: Systems for Management of Operations, Accounting and Reporting. 2nd ed. School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB OH, 1978.

29. Fulton, Major Darrell N., USAF. DOD Resource Management Systems: Planning-Programming-Budgeting System (Draft). School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB OH, 1980.

30. Goodman, Ray. Coordinator, Washington Headquarters Services, The Pentagon, Washington, DC. Telephone interview, January 15, 1981.

31. "How to Get the Most Out of Your Budget." USAF Leadership, Management and Development Center TIG Brief 23, 1980, pp. 11-12.

32. Methvin, Eugene H., Senior Editor, Washington Bureau, Reader's Digest Association, Inc. "Washington's Year-end Spending Spree," The Reader's Digest, September, 1980, pp. 13-14, 18.

33. Nadol, Jack. Project Officer, Year End Acquisition Matters, Office of Federal Procurement Policy, Office of Management and Budget, Washington, DC. Telephone interview. January 16, 1981.

34. Neter, John, William Wasserman, and G. A. Whitmore. Applied Statistics. Boston, MA: Allyn and Bacon, Inc., 1978.

35. Nie, Norman H., and others. SPSS: Statistical Package for the Social Sciences. 2d ed. New York: McGraw-Hill Book Company, 1975.

36. Roberts, Colonel John E. Jr., USAF. Executive Officer, Office of the Under Secretary of Defense for Research and Engineering (Acquisition Policy), Washington, DC, Telephone interview. November 19, 1980.

37. Schoderbeck, Charles G., Peter P. Schoderbeck, and Asterios G. Kefalas. Management Systems: Conceptual Considerations. Dallas, TX: Business Publications, Inc., 1980.

38. Stockton, John R., and Charles T. Clark. Introduction to Business and Economic Statistics. 4th ed. Cincinnati OH: South Western Publishing Co., 1971.

39. Stone, Marvin. "Hemorrhage of Public Funds," U.S. News and World Report, July 14, 1980, p. 76.

40. U.S. Congress. Senate. Subcommittee on Oversight of Government Management of the Committee on Governmental Affairs. "Hurry Up" Spending. Hearings, Part 1, 96th Congress, 1st Session, 1979. Washington: Government Printing Office, 1980.

41. _____. Senate. Subcommittee on Oversight of Government Management of the Committee on Governmental Affairs. "Hurry Up" Spending. Hearings, Part 2, 96th Congress, 2nd Session, 1980. Washington: Government Printing Office, 1980.

42. _____. Senate. Subcommittee on Oversight of Government Management of the Committee on Governmental Affairs. "Hurry Up" Spending. Hearings, Part 3, 96th Congress, 2nd Session, 1980. Washington: Government Printing Office, 1980.

43. U.S. Department of Commerce. Bureau of Economic Analysis. Survey of Current Business. Washington, DC: U.S. Government Printing Office, November 1980.

44. Vitelli, Captain James, USAF. Staff Acquisition Contracting Officer, Plans and Analysis Division, DCS Contracting and Manufacturing, Headquarters, USAF Logistics Command, Wright-Patterson AFB OH. Personal interview. November 7, 1980.

45. Wanner, Lieutenant Colonel Thomas D., USAF. AMIS Action Office, Directorate Contract Data Systems, Headquarters, USAF Systems Command, Andrews AFB, MD. Telephone interview. November 18, 1980.

46. Webb, Eugene. Computer Specialist, Directorate of Computer Operations, Headquarters, Air Force Logistics Command. Personal interview. November 25, 1980.

47. Williams, Karen Hastings. Director, Office of Federal Procurement Policy, Office of Management and Budget. Address to Members of National Contract Management Association, Ohio State University, Columbus, Oh., January 12, 1981.

B. RELATED SOURCES

Alden, Commander John D., USN (Retired). "Tomorrow's Fleet." Proceedings, United States Naval Institute, Annapolis, MD. January 1981, pp. 113, 119.

Brunstetter, Major David A., USAF. "A Guide for Application of Trend Analysis and Other Statistical Methods." Unpublished Master's thesis. AFIT/GST/SM/79M-1, AFIT/EN, Wright-Patterson AFB OH, March 1979.

Coleman, James. Chief, Materials and Base Contracting, Headquarters, Air Force Logistics Command. Personal interview. October 16, 1980.

Comptroller General of the U.S. Summaries of Conclusions and Recommendations on Department of Defense Operations. GAO Report. OISS-80-1. Gaithersburg, MD: U.S. General Accounting Office, Document Handling Information and Services Facility. January 21, 1980.

Defense Audit Service. Report on the Review of Program Execution and Year-End Spending Controls at the Defense Intelligence Agency. Report No. 80-007, Proj. 81G-172, Arlington, VA: Defense Audit Service, October 1979.

Defense Logistics Studies Information Exchange. Custom Bibliography: Fiscal Policies, Search #45-81. U.S. Army Logistics Management Center, Fort Lee, VA, October 2, 1980.

Department of the Army. Procurement Statistics. HQDA(JDHQ-SV-W-P), U.S.A. Headquarters Services, Procurement Statistics Division, Washington, DC, undated.

Driessnack, Hans H. Lieutenant General, USAF, Comptroller of the Air Force. "The Key to Readiness: O&M," Air Force Vol. 63, No. 10, October 1980, pp. 57-63.

Emory, William C. Business Research Methods. Homewood, IL: Richard D. Irwin, Inc., 1980.

Glaister, Clyde O. Director for Program and Financial Control, Office of the Secretary of Defense, Washington, DC. Telephone interview, October 15, 1980.

Morris, Carl. Deputy Chief, Base Procurement Division, Wright-Patterson AFB, OH. Personal interview, September 22, 1980.

Olsen, Lieutenant Colonel J. P., USAF. Deputy Director, Plans and Programs Division, Directorate of Contracting and Acquisition Policy, Headquarters, U.S. Air Force, Washington, DC. Telephone interview, October 30, 1980.

Ravetti, Colonel Louis R., USAF. Funding of Research and Development Programs: A Proposal for Change. Research report No. 177, Air War College, Maxwell AFB, AL, April 1977.

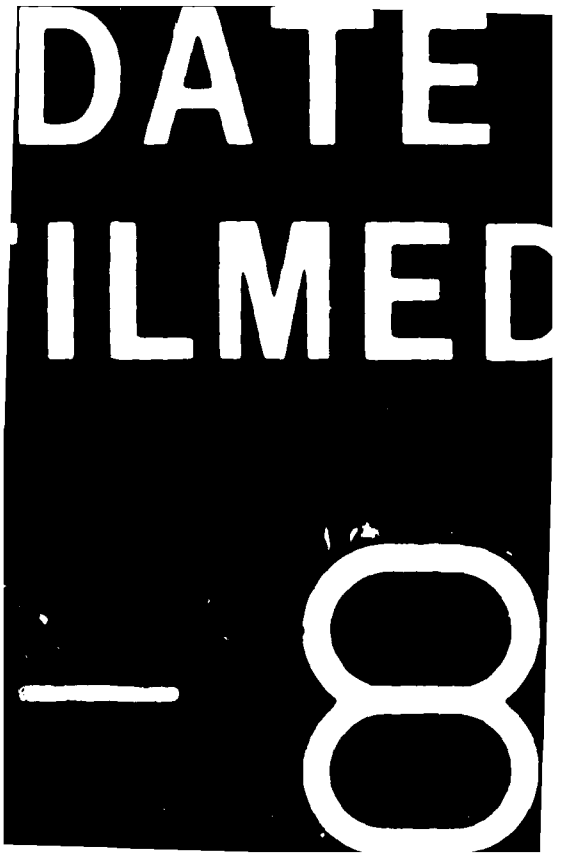
Scanlon, Colonel Thomas D., USAF. Director of Budget, Headquarters, USAF Logistics Command, Wright-Patterson AFB, OH. Telephone interview. October 16, 1980.

Sherwood, Richard W., Captain, USA. "Time Series Analysis as a Technique for Analyzing the Policy Implications of the Expenditure Phase of the Defense Budget." Unpublished Master's thesis. LD 40610A. Naval Post-Graduate School, Monterey, CA, June 1977. AD A044367.

Smith, W. L. Deputy Chief, Contract Placement Division, Directorate of Contracting and Acquisition Policy, Headquarters, USAF, Washington, DC. Telephone interview. May 4, 1981.

Spurr, William A., and Charles P. Bonini. Statistical Analysis for Business Decisions. Homewood, IL: Richard D. Irwin, Inc., 1967.

U.S. Congress. Department of Defense Appropriations for Fiscal Year 1981. On Act., HR 8105, 96th Congress, 2d Session, November 19, 1980. Washington, DC: U.S. Government Printing Office, 1980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